# The Builder.

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Church of St. Andrew, Garratt-lane, Wandsworth.—Mr. E. W. Mountford, A.R.I.B.A., Architect ..... *Single-Page Photo-Litho.*
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### *The Royal Academy Exhibition.*

THE Exhibition of 1888, though, as we thought at first, a good average Academy Exhibition, unfortunately affords more marked evidence than usual of the intellectual failure of many of the most ambitious efforts of English painters of the day. It contains a larger proportion than usual of paintings on a large scale, crowded with figures, and illustrating subjects of great interest, which yet are nothing more than carefully-arranged scenes, more or less well drawn, more or less effectively grouped, but totally deficient in pathos or reality. Mr. F. Goodall's immense canvas, entitled "By the Sea of Galilee" (329), which occupies great part of one wall in Gallery IV., is a repetition of the same idea as that of Ary Scheffer's once famous work, "Christus Consolator,"—a figure of the Saviour as the centre of a crowd of unhappy persons who come to him for consolation under various ills. This, though it is in itself a lofty subject no doubt, is one which, unless treated with great idealising power, almost inevitably falls into the category of mere "religious painting" of the family-Bible illustration class; an appeal to the orthodox feelings of the English middle-class, whose tendencies in this direction Gustave Doré was quick enough to discover and turn to account in bidding for popularity in this country. Mr. Goodall draws the figure much better and more conscientiously than Doré ever did, though we do not think he is immaculate in this respect, looking at the abnormal length of leg of the woman seated on the left of the picture; and he is entirely without that original, though theatrical conception, which gave a certain force and impressiveness to Doré's Biblical paintings. There is a certain pathos and dignity in the figure of the Christ, which is the best thing in the picture; but as a whole it is tame and inexpressive and is a great work only in regard to the number of square yards it covers. The same artist's other painting, "David's Promise to Bathsheba" (189), which occupies the place of honour at the top of the large gallery, is a piece of sheer and offensive vulgarity, of which the less said the better. So with Mr. Solomon's large picture, entitled "Niobe" (712), in which the great Greek legend is reduced to the representation of a set of big coarse-looking figures tumbled about in various ungainly attitudes on a flight of steps; of the poetry and pathos of legend of Niobe and her children the painter is utterly unconscious, and it is merely an excuse for the display of cleverness in drawing figures in variously contorted attitudes. Mr. Schmalz, who is a painter, no doubt, of considerable technical power, selects one of the most tragic subjects that a painter could choose, the fortitude of early Christians who suffered themselves to be tied up in the arena of the Colosseum to be devoured by wild beasts, rather than renounce their faith. But the painting, "Christianæ ad Leones" (542), is a mere display of nude figures tied to a row of posts, with a portion of the amphitheatre and the audience seen above; it is so hard, expressionless, and unreal that it affects one no more than if it were a scene got up by Mr. Augustus Harris at Drury Lane. The lions are, of course, seen through a grated door, for that was necessary to complete the show, but there is little doubt that in fact the animals came up a number of inclined passages from their dens, which were below the arena level, and were not visible till they emerged on to the arena. That is a matter of detail of secondary consequence, however; the objection to the picture is its total want of feeling, and failure to realise the scene it professes to convey to us.

Mr. Tadema's extraordinary *tour de force*, "The Roses of Heliogabalus," a larger work than he usually paints, is also unsatisfactory, not because it does not realise the scene, but because the scene was not worth realising. The subject is a banquet, at which Heliogabalus had the awning surreptitiously piled with roses and rose-leaves, and suddenly smothered his guests under them by having the awning let loose. The front of the scene is a mass of rose-leaves, the brilliant, spotty colouring of which is splendidly rendered, and from this mass emerge beauteous heads and arms struggling to get free. Behind, at a raised table, the emperor, surrounded by some choice spirits, looks on cynically at the success of his joke, from which he does not seem to have got much enjoyment; the fat, jovial friend at his left, with a face steeped in sensuality, is the most characteristic figure in the scene. The tables, with their silver legs and ornaments, and the marble columns at either side of the scene, are splendidly painted, and the whole picture is a triumph of *bravura* painting; but few will think that the result is worth all the ability displayed in attaining it.

The President's large painting,—certainly the most important figure painting of the year,—is the captivity of "Andromache" (227), illustrating that touching prophecy in Homer that in a future day, when her lord was slain and she was captive among strangers, she would be pointed out as the widow of that chief who had fought best for Troy. The painting is a decorative one, arranged somewhat in the same manner as the two frescoes at South Kensington, with a group on either hand backed by buildings, and a landscape seen in the centre as the background. Andromache, a beautiful figure with downcast head and fully-draped in a dark robe, stands in the centre between the two groups, her profile to the spectator; on the right are a group of women, arrayed mostly in warm-coloured drapery, engaged in filling their water-pots at a public fountain or cistern; on the left others are coming on to the scene, some of them bearing jars (the picture affords a fine study of Greek vases), the draperies being mostly cool in tone on this side of the picture. In the foreground, on a lower level, some figures are seen in half-length, of whom a man indicates Andromache to his companion, pointing backward with his thumb. The effect of the picture, as a whole, is very fine, in colour especially; as a composition, or conception, the complaint may be made that, except the man pointing, the subordinate figures seem to have no relation to the principal one, they do not notice her, and do nothing to fill up the *motif* of the scene, except in so far as their easy and light-hearted way of going about their occupation may serve to intensify, by contrast, the grief of Andromache: this is, perhaps, the intention, but it hardly seems sufficient reason for the presence of so many figures, none of which are of any special interest in themselves, though they produce a fine *ensemble* in a decorative sense. However, the principal figure is a fine conception, and worthy of the subject and the painter.

Mr. Orchardson's scene in domestic life, "Her Mother's Voice" (286), is rather a disappointment after those of the last two or three years. It is an interior of a drawing-room, executed with the artist's usual fine though peculiar scheme of colour, where a middle-aged man, quite obviously a city banker, hears his daughter singing at the piano and is reminded pensively of her mother's voice in other days. The subject is a good one, but neither the father nor the daughter are interesting-looking persons, and the banker fails to evoke the sympathy of the spectator. Mr. Marks, on the other hand, has been unusually happy in his painting of the old rector and his naval son returned "from sunny seas," and tracing his voyages on the chart; the two faces are full of character, and all the accessories, the large divinity books on the shelf, the engravings, and the English village with its

square church-tower seen through the open window, are admirably and carefully treated. Near this is another clever interior with figures, "A Love Letter" (81), by Mr. T. D. Millet or Millett (spelt differently on two pages of the catalogue), capitally painted, but the figures are not equal in individuality and character to those in Mr. Marks's scene.

Mr. Frith's picture, called "Poverty and Wealth" (26), will, no doubt, attract a good many of the readers of his amusing and capitally-written memoirs; in his "carriage people" he has caught the *pose* and manner of a certain type of well-to-do people, and the face of the woman who scowls at them is forcible and true. The objection to the whole is that, besides the commonplace of the idea, it is not a picture at all in the artistic sense; it has no effect, no grouping, no light, and seems merely a collocation of people and houses all under the same veil of dingy and dead colouring. Near this is a fine portrait of Prince Bismarck, by Mr. W. B. Richmond, the character of whose subject seems to have inspired him with more than usual force and vigour of style. Mr. Tayler's "A Dress Rehearsal" (45), is a clever picture in the modern "white manner"; and Mr. Otto Schölderer's "Still Life" (48) a good painting which would have been better half the size.

Portraits make the interest of the second gallery, where is a large rather hard painting of the Earl of Harewood (107) by Mr. Poynter, clad in a short thick grey coat that looks as if it had come straight from the tailor's, and is finished with patient realism; and Mr. Poynter's own portrait of himself for the Uffizii Gallery (141; unfinished). Mr. Herkomer's portrait of the Master of Trinity College (127) gives the "Don" character capitally. Mr. Ouless's portrait of Cardinal Manning, in white fur tippet and scarlet cloak, is a very fine thing both in general effect of colour and in the painting of the fine thin eager face. "Monsieur Pasteur" (153) is a bust portrait by M. Carolus Duran, in his smooth and finished, but yet broad, manner; a very expressive portrait. The same gallery contains Mr. A. Moore's principal work, "A Riverside" (139), and Mr. Faed's (126), neither of which interest us much.

Mr. Watts's "Dawn," in Gallery III. (173), is one of the very few ideal paintings in the exhibition; a full-length figure about half size, rising from or standing on a rock, half-draped in a warm golden-toned mantle, the figure being suffused with something of the same tone. The figure is nearly turned away from the spectator, looking away into the dispersing mists; the idea of rising is finely conveyed in the severely perpendicular lines of the figure and the drapery. Mr. Pettie's "The Traitor" (220), though there is something of the ludicrous in the position of the man on his back on the floor, contains some fine and expressive figures among the men who surround their victim, especially the knightly figure seated at the head of the table, and the man on the right who stoops as if to examine the prostrate man and see what a traitor is like; this is a very characteristic figure; we feel as if we had met him in Shakspeare somewhere. Mr. Marcus Stone's "In Love" (236) is one of the best of his works of this class; a youth and maiden seated under shade in a garden, he looking with all his soul at her; a statue of Cupid on the lawn is significantly added; there is a beautiful effect of bright sunlight on the garden beyond. Mr. Gow's "Flight of James II. after the Battle of the Boyne" (273) is to be looked at; there is a forlorn effect in the bare stone pier and the small group of people who look on as the king picks his way down the steps; none of the figures are interesting in themselves, but the scene looks very much as it might have happened, which cannot be said for all historical paintings. This gallery contains two superbly-executed portraits by Mr. Holl, "Earl Spencer" and "Sir W. Jenner" (220, 228), which in force and character could hardly be surpassed.

The best figure picture in Gallery IV. is also a portrait of "Mrs. Arthur Sassoon" (316) by Mr. Herkomer, a lady in black seated in front of a white wall, against which her head is relieved; one of the most effective portraits of the year. Here are also portraits of "Lady Coleridge," by Sir F. Leighton (373); "Mrs. Marquand," by Mr. Sargent (365); but there is also not to be passed over a really fine and pathetic picture by Mr. F. Bramley, "A Hopeless Dawn" (351), the interior of a fisherman's cottage where the dawn and breaking waves are seen through the window, and mother and daughter have nearly fallen asleep from fatigue and sorrow; the daughter's figure half reclined on the floor, with her arm over the old woman's knees, is very fine and pathetic. There is a little too much light outside for the candle-light effect on the table, which is rather overdone. This is one of the unpretending works of real pathos of which one or two are to be found in every Academy exhibition, welcome bits of real feeling amid so much that is conventional and unreal.

In Gallery V. the centre work is Mr. Rivière's life-size knight in armour (413) lying in state with a magnificent bloodhound watching him with a yearning look that is quite pathetic. The knight's sword with a wreath of laurel lies on his breast. The armour is finely painted; there is a true heroic note in the picture; "Requiescat" is the title. M. Aublet's curious, stiff, green-mantled figure, "Turc en Prière" (433), more like a Jew than a Turk by the way, forms a curious pendant (as *Punch* has noted) to Mr. G. W. Joy's nude study, "The Danaïds" (438), on the other side of the door. This latter is a beautiful piece of flesh-painting, though the head is rather hard and expressionless. Near it is a rather theatrical but in its way a most effective portrait by Mr. Richmond of "The Viscountess Hood" (439), seated, *à la* Reynolds's Mrs. Siddons, in a chair of state, in black satin, and in a grand attitude. It is one of the finest and most forcible things this artist has done. Mr. Long's large Egyptian subject the "Crown of Justification" (453) is a splendidly-managed stage scene as a whole, with some fine heads among the semicircle of judges; the mummy of the deceased is placed upright to be accused and receive sentence as to whether honourable burial should be accorded; a woman in the centre arraigns him in an address to the judges, while his mourning relative throws her arms round the mummy as if to protect it. The painting does not seem to take us back to antiquity, but it is a striking subject treated with considerable power and much technical ability. Mr. Joseph Clark's "Youthful Genius" plays the violin in a cottage parlour to the rector and his daughter who have called; the latter is a sweet type of gentle though not intellectual womanhood; the picture is a true bit of real life and character. Among noticeable portraits are also Mr. Herkomer's "The Right Hon. the Speaker" (420), and Mr. Sargent's powerful and we should say disagreeably truthful portrait of a lady (432) who might reasonably complain of the artist's uncompromising frankness.

In Gallery VI., Mr. Holl gives what might be called a new version of Mr. Gladstone (499), whom he has rather rejuvenated. Mr. Dendy Sadler's "In the Camp of the Amalekites" (507), shows a Puritan soldier bound to a chair in the guard-house and subject to the taunts of a row of Royalist troopers, pretty rough fellows, who are not covered with lace and frippery as Royalist troops are generally supposed to be in pictures; the joke is rather an old one, however. Mr. Logsdail's "St. Martin's-in-the-Fields" (548) is a clever and carefully-studied painting of the church and the typical figures of a London street scene, including a good likeness of a Hansom cab with a bony and shambling horse. In the next room, cabs and cab-horses are the subject of a clever study by Mr. Dollman, under the title "Les Misérables" (630). Mr. Seymour Lucas gives us a visit of Charles II. to Wren during the work at St. Paul's (648); the scene appears to be in the western porch, where the shafts of two of the coupled columns are seen half-completed, and a capital is in course of carving in the foreground. Wren, with a thin eager-looking face, bends over the plan with a pair of compasses as if to get an answer to some question of the king's. Charles II., who really cared about the new cathedral, having some æsthetic sense of his own, shows at his best here, and his portrait, as he turns round to express his feelings to an obsequious lord-in-waiting, is very well conceived. Among other works in Gallery VII., Mr. F. Hall has a clever couple of companion pictures, illustrating Lord Tennyson's "The Goose," the main object being the painting of the goose in the foreground, but the old woman and the accessories are all well studied. "The Conscript" (661), by Miss Margaret Dicksee, should be looked at; and no one will pass over Mr. Herkomer's portrait of "Archbishop of Canterbury" (649), in itself a kind of summary of a certain type of ecclesiastical character.

In Gallery VIII. is Miss Rae's work of this year, "Zephyrus wooing Flora" (668), a charming piece of allegorical ideal; the Flora, seated on the grass, and bending back her head to the kiss of Zephyrus, is a most graceful impersonation. We are hurried back into the realistic the next moment by Mr. Dendy Sadler's three old gentlemen in white hats, seated round a table, and waiting for something that is "Old and Crusted" (669) like themselves; they belong to a day when people had leisure to sit out in a tavern garden and drink old port. Mr. Crofts's "Marston Moor" (746), where Rupert and his troops are interrupted in their supper by the first cannon from the other side (which makes the horses start), shows all this artist's usual ability and realistic power in dealing with subjects of this class, but it has not the interest and action of some of his former works. Mr. John White's "Strayed" (693) should be looked at, as also a curious little allegorical work by Mr. C. W. Whall, "Hortus Animæ" (703), a leaf out of the book of Mr. Arthur Hughes; and Mr. Hughes's own work in the same room (680), and Miss Lovering's clever little picture of children looking at the "Brighton Express" (714), only indicated by the steam from the cutting, and Mr. Burr's "Blindman's Buff" (754), a good bit of *genre*.

Mr. Caton Woodville's "Too Late: Last March of General Sir Herbert Stewart" (1,011), in Gallery X., does not quite explain the situation; the English troops in the middle distance seem to be firing at something in the direction of the spectator's right, while apparently Arab troops fire at them from the hill behind; but the foreground group is of the greatest interest, and has been very carefully studied. The dying figure of General Stewart on the litter is a noble one, so is that of Colonel Boscawen standing with his hands before him resting on his sword looking at the combat; the two big black soldiers in the foreground in their blue jackets and loose white trousers, are most characteristic figures. There is a reality and absence of theatric effect about the scene and figures which is very striking, and reminds us how artists have advanced in their notion of painting modern battles, since the day when the "Death of General Wolfe," with its stage arrangement and posing, could be considered a satisfactory representation. Our battle painters now really set themselves to find out how the scene and the actors actually appeared, instead of creating dramatic battles out of their heads. Similar praise may be given to Mr. Eyre Crowe's "Nelson leaving England for the last Time" (1,055), which rather gave us pause at first, the scale being so different to the small figures we have been accustomed to from Mr. Crowe; it looks somewhat unhappy and dingy in colour; but it is a work that grows upon one; the figure of Nelson, silent and serious amid the cheering and hand-shaking, is heroic; the painter seems to have got hold of the personality and character of the pig-tailed man-of-war's man of the period, and there is a rude energy in the figures of the old boatmen who follow the boat into the water to shake hands with Nelson. Mr. Ouless's portrait of "Mr. Ewan Christian" (1,018) is as good a likeness as could well be seen in a portrait; and Mr. Carl Schloesser's "Molière" (1,040) reading one of his comedies to his housekeeper, is a clever work both in conception and execution.

In Gallery XI. Mr. Kennington shows a picture which may pair with Mr. Bramley's "Hopeless Dawn" before mentioned, as a true painting of the tragedy of humble home life; this is "Widowed and Fatherless" (1,126), an interior with three figures, mother and children: the noticeable point in this picture is that without anything like academic posing, and while each figure is true and expressive in itself, it is, nevertheless, thoroughly well composed,—it is a *picture*, in fact, which is just what Mr. Frith's moral or social homily aforesaid is not. Mr. Stanhope Forbes's "The Village Philharmonic" (1,143) is a clever thing, especially in the contrast between the leader in spectacles, evidently the best educated man of the group, and the laborious efforts of the rustic in the foreground who grinds away at his violoncello with painful anxiety on his countenance. Mr. Kennington has also a very able bust portrait, "Mrs. Farebrother" (1,105), a curious study in colour; and another very original and refined portrait in the same room is Mr. Blake Wirgman's "Mrs. C. Bine Renshaw" (1,087), a half-length in a circular border, in rather an old-fashioned style, and very carefully finished. Near this is one of the cleverest of the lighter works of the year, by Mr. G. C. Hindley, "A Hit, a very Palpable Hit!" (1,088), a tavern scene, with bills of the "Beggars' Opera" and "School for Scandal" on the wall, where two gay young men, who might be Charles Surface and Careless, have made some joke which shocks the odd-looking parsonic figure who is a bad third at the table. The old furniture, glasses, &c., are beautifully painted, and the gaiety of the two young men is quite infectious.

We must speak of landscape and sculpture in the Academy on another occasion.

## COMPOSITION OF ANCIENT MORTAR.

BY JOHN HUGHES, F.C.S.

THE superiority of ancient mortar over that of the present day is generally acknowledged. and it has been supposed by many authorities that this superiority was the result of some special method of preparation.

Whether this really was the case future investigation and careful research will, no doubt, decide; but the object of this communication is to place on record the results of a full and exhaustive analysis of some pieces of mortar taken from the interior of the walls of Corfe Castle. During a recent visit to Bournemouth the writer devoted a morning to an examination of these interesting ruins, and was much impressed by the tenacity with which the huge masses have clung together and resisted the attempt of those in possession to utterly destroy the walls.

Instead of being blown up into small fragments the walls have been split up into huge irregular masses, while the effect of the gunpowder on the solid masonry of the keep is particularly remarkable; one side being forced bodily several feet from the foundation, but still retaining its original shape, while the other side remains untouched and in an upright position, as when first erected.

By the courtesy of Mr. H. O. Chislett, the steward of the Corfe Castle estate, the warden was instructed to send several pieces of the mortar taken from different parts of the interior of the walls for analysis, and the results were of such interest that I have thought them worthy of publication:—

*Composition of Mortar* (1).

| | |
|---|---|
| Water, dried at 212° Fah. | 8·08 |
| Loss on ignition | 2·52 |
| Oxides of iron and alumina | ·68 |
| Lime | 31·47 |
| Magnesia | ·37 |
| Potash | ·19 |
| Soda | ·14 |
| Sulphuric acid | ·25 |
| Phosphoric acid | ·06 |
| Carbonic acid* | 11·53 |
| Chlorine | ·62 |
| Silica (present as silicate of lime) | 8·42 |
| Insoluble siliceous matters | 35·67 |
| | 100·00 |
| * Equal to carbonate of lime | 22·86 |

In order to make these results more practically useful, it will be convenient to append a copy of a partial analysis of some mortar taken from one of the large modern buildings recently built in the City of London.

*Modern Mortar used in London* (2).

| | |
|---|---|
| Water, dried at 212° Fah. | ·53 |
| Loss on ignition | 2·03 |
| Oxides of iron and alumina | 4·05 |
| Lime | 7·75 |
| Potash and soda | ·15 |
| Carbonic acid* | 5·06 |
| Silica (present as silicate of lime) | 2·35 |
| Insoluble siliceous matters | 78·08 |
| | 100·00 |
| * Equal to carbonate of lime | 11·50 |

When these two analyses are compared, it will be seen that the Corfe Castle mortar No. 1 contains nearly four times as much lime as No. 2, the modern London mortar.

Further, that while No. 1 contains only a mere trace of iron and alumina, 0·68, the other contains 4·05 per cent., or more than six times as much. Also, that No. 1 furnishes 8·42 of silica in the form of silicate of lime, as against 2·35 in No. 2 mortar, so that the former possesses to a considerable extent the properties of good Portland cement. Lastly, the proportion of siliceous matter in No. 1 is not only much less,—namely, 35·67, against 78·08 in No. 2,—but upon examination under the microscope it was found to be far more angular and sharply-faced, and consequently much more effective in binding the mortar together than in the other, where the sand was rounded off, such as river or sea sand would present. The Corfe mortar was much damper, 8·08 per cent. of water being lost upon drying in a water-bath, against 0·53 in the other mortar.

This excess of moisture may to some extent have been due to accidental circumstances, such as the soaking in of rain during the winter months, but the natural porosity of the stone will readily explain the presence of a high percentage of water. Under the microscope it has the appearance of a honeycomb, with numbers of minute holes, the whole bound together in one compact network, possessing great tenacity, and natural resistance to fracture.

According to the generally accepted theory, lime, when setting as mortar, becomes converted into a state of carbonate, while lime, when setting as cement, becomes converted into a silicate.

In the Corfe mortar both these processes appear to have occurred together in consequence of the limestone containing silica in a form capable of combining with the lime to produce a silicate of lime.

The general conclusions to be gathered from this investigation are as follow:—

1. That in ancient mortar, such as that of Corfe Castle, a much larger proportion of lime was always used than at present is the practice.

2. That a superior quality of lime was employed and that the proximity of good limestone for burning purposes was as important as the presence of good stone for building purposes.

3. That sand of an angular character with sharp edges is much more effective than sea or river sand which possesses a rounded surface, and is, therefore, less binding.

4. That if more attention were paid to the quality and composition of mortar and its freedom from rubbish, such as earth of a clayey nature, new buildings would be more durable and require repairs less often.

**Colfe Grammar School Competition.**—In the second competition for this school the five selected competitors were Messrs. Weatherley & Jones, Messrs. Giles, Gough, & Trollope, and Mr. Bonnor, all of London; Messrs. Clarke & Moscrop, of Newcastle-on-Tyne; and Mr. Parsons, of Exeter. The Leathersellers' Company having appointed Mr. G. A. Wilson (Wilson, Son, & Aldwinckle) the professional assessor, that gentleman has made his award and placed the design of Messrs. Weatherley & Jones "first." The plans will be exhibited after the approval of the Charity Commissioners has been obtained.

## NOTES.

THE excavations carried on by the German Archæological Institute on the site of the temple of the Kabeiroi, near Thebes, are now brought to a close. We have twice referred to the curious "find" of inscribed votive offerings within the precincts of the temple. A few days back we were able to visit the actual site, and under the invaluable guidance of Dr. Wolbers, who has superintended the work, we made the tour of the excavations. A ground plan of the temple will appear in the next issue of the German *Mittheilungen*, but, meanwhile, we may briefly note its principal features. It consists of pronaos, cella, and opisthodomos, the pronaos being faced by four columns, of which traces clearly remain. It is the opisthodomos which presents the most marked peculiarities. Within it lay the great sacrificial trench, in which the excavators found masses of bones belonging to various sorts of animals. Further, the opisthodomos, contrary to Greek custom, has no back entrance, but is approached by two doorways, one at either side. The foundations of this portion of the temple are exceedingly slight, and this seems to point to the conclusion that it never bore a roof, but was, in fact, only a walled enclosure, open at the top to allow the smoke of the sacrifices to escape. The temple, as it now stands, bears clear traces of being an enlargement of an older building. This older structure consisted of a smaller cella and pronaos, only the opisthodomos did not exist; probably in these earlier times sacrifices were made simply on an unenclosed altar, such as still exists in front of the pronaos. Within the cella, at the west end, are marks of a large step or pedestal, which, no doubt, once supported the temple statue. It was in front of this step that the great mass of bronze and terra-cotta votive offerings were found. Beneath this step and the back wall of the cella the excavators have come upon a curved fragment of polygonal masonry (the earliest found), which it is supposed formed part of the original precinct. To the north-west of the temple steps lead down to a series of chambers, which were probably dwellings for the priests. In a line with the front wall of the cella is a wall stretching south; it bears traces of six columns, three on either side of a door space. Its purport is not quite clear, but it may have faced a stoa. All the smaller objects found have been brought to Athens, where a selection will shortly be on view to the public. Inscribed stones and architectural fragments will be left in the local museum at Thebes. Among the inscribed monuments we may specially note a marble chair bearing a dedication "to the Kabeiros and his son" (ΚΑΒΙΡΟΙΚΗΠΑΙΔΙ). Of great interest, too, are some stones bearing masons' marks, clearly of two periods, fifth and fourth centuries; these stones were no doubt used for the early building and marked with archaic letters, and then re-used and re-marked with later characters for the second structure.

THE New Gallery in Regent-street, as we expected, is practically the Grosvenor Gallery in a new situation, as far as the pictures are concerned; but architecturally it is more than this, and comes rather as a surprise. No exhibition in London can show anything like the central hall, which forms at once the sculpture gallery and vestibule to the picture galleries. The visitor enters through a corridor from the street (the building has no street front) and finds himself in a large and lofty square hall surrounded with a colonnade of square marble columns, a small fountain in the centre, and a gallery with gilded railing of Greek design running round at half the height of the order. Opposite the entrance two doors lead to the west picture gallery; on the north side of the hall the floor of the aisle formed by the colonnade is raised two or three feet, and we ascend by steps to the north gallery. The gallery running round the half height of the hall, and reached by a staircase in the corner, forms a place for hanging smaller works, water colours, drawings, &c. From

this gallery open the refreshment rooms, over the entrance and lighted from the street. The general architectural effect of the central hall is solid, and at the same time rich in effect; the massive square columns are of Cippolino marble, the walls are lined with the same marble combined with Giallo antico, with bands of Pavonazza and borders of Rosso antico; these are arranged in panels above a plinth of dark marble, with a moulding of grey marble. The walls above the gallery level are lined with a gilt diaper. The columns have large gilt capitals, with a double bracketed cornice over them, the brackets being only introduced over the columns, however; the remainder of the cornice runs round with a large soffit filled with gilded foliage in panels. The projection of this cornice looks rather too much with this treatment; the frieze is perfectly plain, but the tenia has blocks and guttæ at intervals, answering to the places where the triglyphs would be if they were employed. This way of employing one ancient feature while taking away the other which gave it its meaning, does not seem a very reasonable way of manipulating the materials of antique architecture. The frieze is faced with platinum, giving it a metallic lustre, with good and rather novel effect. The ceiling is of an elliptical section, with a large skylight filled with stained glass, with a design of a Renaissance character in delicate yellow tints. The sculpture has mostly been arranged around this hall. The floor of the hall is paved with grey marble with bands of red and white, and in the centre is a square fountain basin throwing up a small thread of water, and surrounded by a small moulding raised an inch or two above the pavement. Into this fountain visitors will probably step from time to time while looking about them at the building or the sculpture. The upper gallery is paved with random mosaic, and lighted by a series of small glass domes,—only plain glass, in radiating bars. An opportunity was surely afforded for something rather prettier than this in the glazing of these domes. The two picture-galleries are alike in design, lighted from large central skylights, supported on a large cove, the walls covered with a diaper in crimson. It is a great pity that it was thought necessary to place a couple of thin starved-looking planted-on pilasters on each of the longer walls; they are totally unnecessary, and, in fact, spoil the room, and interfere with the hanging space. Otherwise the whole is a most successful "installation," and the light is good. As to the pictures, there is plenty to see, but we have so much space given to Academy pictures this week that we must leave the New Gallery pictures for another week.*

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IT is to be hoped that the result of the debate in the House of Commons on the 5th inst., in regard to the State purchase of railways, pursuant to a motion by Mr. Watt in favour of a Royal Commission to consider the question, will suffice to prevent future waste of time and words about this really preposterous idea. The motion was negatived without a division, after what Sir Michael Hicks-Beach termed an "academic" debate, in which he never remembered to have heard so important a proposal supported by weaker arguments. The mover of the resolution went back to 1844, when a considerable section of the community was in favour, he said, of the purchase of railways by the State; as if any one could have known at that period what the railway system was to become. Mr. Gladstone threw an amusing light on this part of the argument by relating the circumstances under which a commission of scientific men was appointed under Sir Robert Peel's Government to inquire into the best route for a railway into Scotland, the reason for this unusual course on the part of the Government, which did not intend to construct the railway, being that as it was assumed that only one railway into Scotland could be possible, it was of national importance that the best route should be discovered before it was too late! The Government, Sir Michael Hicks-Beach said, had no right to accept the proposal for a commission unless they agreed to the principle of the purchase and management of railways by the State, and in his opinion "nothing could be more injurious or more mischievous than such a policy." The purchase could not be effected without adding so enormously to the national debt as perhaps to cause a financial disturbance which might even affect the credit of the country. Both the mover and seconder of the resolution had assumed that the railways were to be worked by the State, and as the State could not rightly enter into competition with private persons for mere profit, it would be necessary to show that the railway system would be better worked under the State. He (Sir Michael) "did not believe it for a moment," nor do we. Putting aside all the financial part of the question, we are convinced that the result would be a falling-off in the energy and rapidity of the train services of this country, which are at present in advance of those of the whole world, as may be seen by comparing statistics of speed and number of trains on the main railways of the leading nations. Something would be saved in rate of fares to the public, but nothing to compensate for what must be taken from them in taxation, and we should almost unquestionably have a slacker management and slower travelling. Then there is the serious business of the Government taking into its employ a new army of over 350,000 men, the dealing with whom might prove, almost certainly would prove, a very serious drag on the Government. All things considered, we may think it a matter for congratulation to the country that the idea of State purchase, though discussed in the infancy of railways, was abandoned, and that private enterprise has been allowed full scope. The public have had valid reason for complaint as to railway rates. With these grievances legislation can deal, but legislation could never have ensured such a splendid and energetic development and conduct of railway locomotion as is seen in our three great lines, the London & North Western, Midland, and Great Northern, which may, we believe, fairly challenge the whole world in regard to speed, punctuality, and locomotive construction.

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AS some of our readers will have noticed in the daily papers, Mr. Justice North has been called on to decide a rather curious point as between the Royal Academy and the Trustees of the Chantrey bequest. It appears that Chantrey's bequest entirely forbade commissions to artists, and only empowered the Academy to purchase executed works which appeared worthy of selection for their merit. The Royal Academy consider that they are very much hampered in the purchase of sculpture by the literal interpretation of this clause, as owing to the cost of the material and execution of sculpture in a monumental form, only a minority of sculptors can afford to execute works in marble or bronze except on commission, and the Academy, whose views were set forth in an affidavit by Sir F. Leighton, thought they ought to be empowered to select models in clay or plaster for execution, provided the bronze or marble production were equally satisfactory. The learned judge, after very careful consideration of the case, decided that such a course was not in keeping with the terms of Chantrey's bequest, and was not contemplated by him; and we think his decision is right. Had Chantrey not been a sculptor it might have been argued that he had overlooked the conditions of sculptural production. But he knew all about this, and evidently did not recognise models in perishable materials as finished works. This is apparent from the terms of his will in regard to the completion of his own unfinished works. As Mr. Justice North pointed out, no one could pretend that the Academy had a right under the bequest to select a sketch for a picture, and commission and purchase the finished picture. If it were urged that there was a difference in this respect between painting and sculpture, the answer was that Chantrey himself did not give any indication of having this in his mind. Whether it would better for art that the terms should be relaxed in regard to sculpture is another question, but there can be no doubt that the terms of the bequest do not justify that course. We are inclined to think it is better as it is. Chantrey probably intended to give encouragement to the production of great works of art by providing a market for them, if they came up to the required standard. He had no intention of making things easy for those who aspired to the honour of purchase under his bequest.

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THE paper on "Drawing as a Means of Education," by Mr. T. R. Ablett, published in the last number of the Society of Arts *Journal*, is an able *résumé* of what is now the recognised opinion as to the importance of drawing in an educational system, among all those who have given intelligent attention to the real meaning of "education." There is a great deal to be done, however, before the reform in regard to this subject can be said to have passed from the theoretical to the practical stage. Mr. Ablett maintains, and we fear too correctly, that "the teaching of drawing in nine-tenths of our higher schools is simply a farce when compared with the teaching of other subjects," and only last year the head-master of a large grammar school, where Mr. Ablett had examined in drawing for the first time, said "he could not permit progress in drawing to affect a boy's chance of promotion from one form to another." That this is the tacit understanding at most schools we all know; it is the habit of English school teaching; drawing is placed on the same footing with dancing, as an "extra"; but that an educated man, head of a school, should deliberately express such an opinion about drawing as a study by which a pupil's intellectual progress could in no way be gauged, is certainly curious. It is a mental attitude in regard to the subject which cannot, however, be kept up many years longer, even by the most conservative and "philologistic" of schoolmasters. One point in Mr. Ablett's paper calls for special comment, namely his impression that "freehand" drawing, exclusively taught, is detrimental. Visiting a number of schools to find out "why the drawing languished," he came to the conclusion (and was directly told in one instance by the head master) that the continual practice of freehand was cramping to the pupils, and gave them a distaste for drawing. Mr. Ablett's recommendation is to commence with drawing from objects, and we are inclined to think he is right, as far as teaching a young child what drawing really means and how objects can be represented. But let not this be made an excuse for throwing over the severer practice of freehand drawing. This is really the cultivation of the power of the hand and eye to produce fine and well-balanced lines and accurate proportions. The sketching of objects in a kind of "do-it-as-well-as-you-can" manner, though, undoubtedly, more interesting to the beginner, does not teach him to value or to attain clearness and precision of line and curve, without which he cannot really be said to "draw" in the true sense of the word.

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WE were glad to observe that in the discussion on railways and injuries to railway servants in Parliament, on Tuesday, Sir Michael Hicks-Beach made some decisive remarks as to the really wonderful percentage of safety in railway travelling and railway working at present. The public generally have no idea of the elaboration of the precautions which are taken for their safety; and radical philanthropists, who from time to time attack railway companies in the interests of some downtrodden class, are the last kind of people to know anything about railway working. With the cause of railway *employés* we have the strongest sympathy, but it is perfectly absurd to compare statistics of the proportion of accidents to passengers with those of accidents to *employés*, who are always on the line and among the carriages or wagons. Mr. Maclaren draws atten-

* Messrs. Peto Bros. were the general contractors for the building; the marble work is done by Messrs. Farmer & Brindley; the stained glass, gilding, and platinum work by Messrs. Collinson & Lock; the roof glazing by Messrs. Mellowes & Darby (of Sheffield); the parquet floors by Mr. Ebner; the hot-water and gas by Mr. Cannon. Mr. Higgs was the clerk of works.

tion to the number of accidents to shunters, for which, he says, none of them got compensation; but has he ascertained how many of these were accidents avoidable by common care on the part of the men? There is a tendency among all men in an employment in which there is a certain amount of danger to be guarded against, to grow careless and ignore the danger; it is much to be regretted they should suffer for this, but if the danger is really avoidable by common caution, is it fair to the employers to put the responsibility on them? We do, however, agree that, considering the universal tendency of men to get into danger when there is a possibility of it, in any employment they are constantly at, and the impossibility of compelling them to take care of themselves, the railway companies ought to adopt a coupling system which does not necessitate going between the wagons, as it is on goods trains that coupling and uncoupling is most used. That is the reason of the higher rate of accidents to guards and porters in connexion with goods trains as compared with passenger trains, about which Mr. Maclaren made such a fuss and said "there must be a reason for it." The reason is the most natural in the world: the opportunities or chances of accident are fifty-fold greater in connexion with goods trains, because they are cut up and shifted all along their route, to leave wagons at various stations to be unloaded; while passenger trains are very little broken up, and they load and unload themselves, and have not to be shunted into sidings to do it. Yet here is an M.P. so ignorant of the common-sense of the matter as to make the greater proportion of accidents on goods trains the subject of a distinct charge against the companies.

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THE Glasgow Exhibition was formally opened on Tuesday, the 8th, by the Prince and Princess of Wales, under attendant circumstances of the most propitious kind. The weather was faultless throughout, and probably on no previous occasion within the range of its history has Glasgow been so lavishly decorated in its streets and buildings, or so thronged with visitors and holiday-makers. By noon, and well in advance of the hour at which the royal procession was timed to arrive at the ceremonial entrance, the last touches had been applied to the permanent internal economy of the building, which was, therefore, thrown open in a condition of virtual completeness. For some days and nights previously the exertions of the Council of Management had been incessant, literally; and even on Sunday, the 6th, the press of the finishing work was continued. A limited first edition of the official catalogue was issued on the opening day, but the margin has been too narrow to permit of a satisfactory treatment of details against our issue of this week.

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IN an article in the current number of the *Archæological Review*, Dr. Joseph Anderson, secretary of the Society of Antiquaries of Scotland, complains that the buildings on the Western coast of Ireland, which have been placed under the care of the Irish Board of Works under the provisions of Sir John Lubbock's Ancient Monuments Protection Act, have been so severely "restored" by the Department as to have lost all their character as national monuments, and to have become practically useless for all purposes of reference. This is the usual course of events; buildings are allowed by their custodians to fall into decay, and when they pass into the hands of some public body they are "restored," at a vast expense, beyond recognition. A similar complaint has been made with regard to the ancient monuments in Bombay and elsewhere in India, which have been placed under the Department of Public Works, who have replaced missing features and invented new ones in keeping with the old, until the whole interest of the buildings has been destroyed.

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THE latest discovery on the Acropolis at Athens is that of a second head, of porous stone, brilliantly coloured, of exactly the same character as the so-called "Triton" head which has recently attracted so much notice. There can be no doubt whatever that they belong to to one and the same composition, probably a set of pediment sculptures. So large has been the mass of similar fragments found that it seems reasonable to hope that it may be possible to reconstruct the whole composition. The new head is not quite so well preserved as the one first found, except the long spiral curls which fall at the back of the head, which are in excellent preservation. The beard is broken away, but enough remains to show it was also coloured blue; the moustache is similar in shape and colour, the eyeballs are the same peculiar emerald green. A bronze inscribed tablet just found is also of great interest; half is unfortunately broken away, but enough remains to restore the main sense:—

οἱ ταμίαι τάδε χάλκεα . . . .
συλλέξαντες δῖος κρατερο . . .

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THE speeches at the Royal Academy dinner did not suggest any new or noticeable views about art. Professor Tyndall made some happy remarks about the relative fields of art and science, quoting the remark of a late member of the Academy (name not given),—"Let Raphael take a crayon in his hand and sweep a curve; let an engineer take tracing-paper and all other appliances necessary to accurate reproduction, and let him copy that curve,—his line will not be the line of Raphael." True; and then perhaps the engineer may say in turn, "Put an artist down before a locomotive engine, to make a drawing of it, and he will not represent it correctly." The training of science and art is different, and calls out different perceptions and powers. Professor Tyndall suggested a common ground for science and art in this, that to reach their highest achievement they must both pass beyond knowledge and culture to the region of imagination and creative power; as an eminent German mathematician (quoted in *Nature* the other day) said of the wielders of the higher mathematical analyses, "Wir sind Dichter,—"we are poets." Sir Frederick Leighton, in responding for the Royal Academy and its President, paid a tribute to the memory of Mr. Cousins and Mr. Oakes, and of Sir George Macfarren as a "brother President" lately deceased; and alluded feelingly also to the former friend and frequent guest "whom they affectionately called Mat Arnold." In continuing his speech, the President referred to the remarkable interest of the collection of Italian Renaissance reliefs and bronzes which formed (as we said at the time) the real value of the winter loan exhibition of this year, and which Sir Frederick Leighton, perhaps correctly, said was only very inadequately appreciated by the public.

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THE season of flowers has now arrived, and London windows will be gay with them. The florists will drive a flourishing trade in window-boxes. It is not untimely, therefore, to suggest to those about to purchase them to exercise some discrimination and show some taste in the choice of the tiles wherewith to cover them. Nothing is so incongruous as patterns of flowers and foliage on the tiles. The latter should set off and be a groundwork of sober colour for the varied hues of the flowers above them. Brown is, perhaps, the best of all colours, for it is a foil to both flowers and foliage, whereas green, though suitable enough for flowers alone, is apt to disagree with the natural green of leaves. But the main point to bear in mind is, that patterns and particoloured tiles can never be suitable for the purposes of adorning flower-boxes.

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THE current number of the *Fortnightly Review* contains an article by Mr. William Morris, under the title "The Revival of Architecture." It gives a good and true sketch of the recent course of modern architectural revivals and the influences under which they developed, occasionally stated in very bad and vulgar English (*e.g.*, "a goodish many houses of this sort have been built." How does the editor of a paper of the old high standing of the *Fortnightly* come to pass such a sentence as that?), but in the main a good *resumé* of recent architectural history. The moral of the article is that we have found out the fallacy of imitating dead styles, and that there will only be a living new style when mechanical drudgery is at an end, and when beautiful architecture is the need and desire of the people at large, and is produced by the people at large. In short, architecture depends for its future life on socialism. This is a gospel which Mr. Morris has repeatedly preached. That implies a society not only of general independence and freedom from want, but of general intellectual culture and refinement. That may come some day, but will be in the far distant future, not in our time. Mr. Morris's article is worth reading, however.

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WE are glad to hear that Mr. Plunket intends to recommend to the Postmaster-General the setting back of the north wall of the new additional buildings to the General Post Office, so as to preserve the Roman wall. It is well worth preserving so interesting a remnant of the ancient wall, and we do not anticipate that any real injury will be done to the new building by the very slight curtailment which will be necessary.

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THE beautiful florid carved oak choir-stalls from the Carthusian monastery of Buxheim, Bavaria, which we described in a "Note" in our issue of August 28, and illustrated on September 4, 1886, are again on view in London at Piccadilly Hall, having been found unsuited to the position in one of the Cambridge colleges for which they were purchased. In the same room with them may be seen another unusually fine specimen of wood-carving in an altar-piece from the Low Countries, said to have been designed by Van Eyck, and carved by Henri Bauermans. It stands about 8 ft. high by 9 ft. wide, and is divided into six compartments, in which are groups of beautifully-finished figures, representing some of the series of incidents in the life of the Blessed Virgin commonly portrayed, the presentation in the Temple, the marriage, the birth of Our Lord, the adoration of the Magi, the death and the burial. The exquisite finish of the work in every detail is as remarkable as the expressive attitudes of the figures, and its perfect preservation is also properly claimed as exceptionally good. The perfection of the work may be best appreciated by comparing it with some carved cabinets of about the ordinary level of excellence which the exhibitor, Mr. Ichenhauser, of Bond-street, is showing in a small room adjoining.

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THE system of collecting sawdust, chips, and shavings from wood-working machinery by means of a pneumatic system of pipes, introduced some years ago by Messrs. Allan Ransome & Co., consists of a fan, the exhaust branch of which is attached to a main, extending round the shop, with branches leading from it, the open ends of which are placed in such a manner that the chips, shavings, &c., thrown off by the cutters of the machine will be sucked into the pipe or closed wooden trough, as the case may be. The current of air then carries the refuse to a suitable brick bin. There has been some difficulty accompanying the use of the arrangement, as the current of air must escape in some way, and in doing so it has always carried with it a considerable quantity of fine dust, even when close wire screens have been used. In order to get over this drawback Messrs. Ransome have adopted a device lately introduced, which is known as the "Cyclone Dust Collector." It consists of a flat drum of galvanised iron, into which the air main delivers. The drum has no bottom, but attached to its under side is an inverted hollow cone, at the apex of which is a pipe which delivers into the brick bin for holding the shavings, &c. Within the cone there is a flat worm with four turns. The blast is introduced into the drum tangentially, and is thus given a whirling motion. The solid particles are thus thrown against the sides by the centrifugal force, and continue their course down the cone, guided by the worm. As they descend, the circular motion of the particles becomes smaller

and smaller in consequence of the lessening diameter of the cone, and at last they drop quietly into the brickwork receptacle, whilst the air escapes through suitable openings in the top of the drum. The action is similar to that of steam separators, which have been introduced with considerable success to separate particles of condensed water from steam. A public exhibition of this apparatus was held at Messrs. Ransome's works a few days ago, when it was conclusively proved that the principle was perfectly sound, and that the machine was capable of carrying out the promises made on its behalf.

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IN regard to the recent correspondence in our columns about the grates in the Board schools, we have received a letter from Mr. J. Russell Endean very indignantly denying the insinuation of Mr. Boyd that he (Mr. Endean) was in some way interested commercially in the promotion of the Heim grate. We are quite satisfied that there is no ground for such an accusation, and that Mr. Endean has only been acting on a desire to get what he considered the best grate into the schools. But we are disposed to believe, from inquiries we have made, that he has been premature in proclaiming his favourite Austrian grate as the ideal grate of the future, and that his statements as to the failure of Mr. Boyd's "Hygiastic" grates have been greatly exaggerated (no doubt unintentionally), and are very unfair to the patentee of that grate. Mr. Endean's first letter, which gave rise to the correspondence, was, of course, published on his responsibility only.

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A CORRESPONDENT of the *Times*, referring to the unpopularity of certain newly-conceived taxes, suggests to Mr. Goschen the taxation of bills and posters, saying that these are such a disfigurement to our streets that every one would gladly see them kept in check by a tax. The tax could easily be collected by requiring an adhesive stamp on the placards. It is a happy idea. Could it not be further extended to barrel-organs? A good round tax on these pests of London life. This would indeed be, in the terms of the *Times* correspondent, "both popular and satisfactory."

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## ARCHITECTURE AT THE ROYAL ACADEMY.—II.

CONTINUING our notice of drawings in the Architectural Room at the Royal Academy, in the order of hanging, we come on a design for a "New Barge for Magdalen College, Oxford" (1734), by Mr. E. P. Warren: a pretty water-colour drawing, but hardly worth while to make a special design if it came to nothing more original than this erection with uprights with knobs on the top and gilded garlands at intervals. Considering how suggestive a thing a barge is, something more picturesque might surely have been made than this, which is merely an ordinary house-boat, with some *rococo* on it. The black-and-white cable moulding round the gunwale relieves it a little.

1737-8, "Windows in North Gallery, St. James's Church, Piccadilly"; Messrs. Ward & Hughes. These are windows suitable to a Renaissance church, with central pictorial designs (too high to be well seen) with several "orders" of border forming a broad decorative band; general effect rich and suitable, but the rather ragged outline of the canopy over the centre, relieved against a dark blue background, has not a very good effect.

1741, "Ceiling of a Drawing-room"; Mr. G. Aitchison, A.R.A. A slight pen-drawing of a ceiling in nine compartments (besides bays), moulded in panels with broad ribs between, each panel showing a figure design in an inner compartment, surrounded by delicate scroll-work varied in different panels, apparently plaster in delicate relief. Pretty, and worth a more finished drawing than this, which does not indicate the real effect of the work.

1745, "A Country House"; Mr. Ernest Newton. Two little elevations and two plans, which latter the author is to be commended for exhibiting. The elevations show a brick front with simple mullioned windows (why battlements?) and a side elevation with black-and-white work picturesquely applied: it looks very like an old house. The open court in centre of the plan is very small, if any trust is being put in it for ventilation.

1747, "Side of a Drawing-room"; Mr. G. Aitchison, A.R.A. We presume Mr. Aitchison is responsible only for the decoration, not for the architecture, which is an odd medley, with its pointed-arch recesses between classical pilasters. Brown (mahogany?) doors and surbase, with figures and decoration in light on the door panels; a warm red prevailing on the walls except in back of the recesses, which are green broken with a diaper. The spandrels over the arches show coloured decoration on a gold ground, the frieze a gold foliage design. The woodwork is a puzzle, and looks as if it had to be dealt with as existing, but a fairly harmonious result is achieved.

1748, "Design for a Book Cover"; Mr. R. Hallward. Two angels in bright red garments holding a scroll with the title "Flowers of Paradise," with radiations of lines upward and downward; an effective and unusual design for the purpose, in a department of work in which we require more artistic invention.

1749, "Moxley, Holmbury"; Mr. Basil Champneys. Two delicately-executed pen views of a quietly picturesque house, with no special style unless we call it "English rural." A sketch plan is added.

1751, "A Provincial Post Office"; Mr. F. Masey. This is a coloured drawing of a competition design for the Tite Prize, called "Italian," but it is a very Gothicised variety of Italian. It is an effective and picturesque design, however, though the high roof is most unpractical, and would not be allowed in any Government post-office in this country, provincial or otherwise.

1752, "Interior of Lady Chapel, new R.C. Church, Folkestone"; Mr. Leonard Stokes. This is part of the same church already referred to, with somewhat similar details, but the roof is open-timbered. It is worth attention as an excellent specimen of architectural drawing in pencil, clear, and not over-laboured.

1754-5-6, Three pen-drawings of the Liverpool Cathedral design, by Mr. James Brooks, south-east view, north-east view, and interior. These three drawings together make a grand show, and worthily sustain Mr. Brooks's reputation as the inventor of the most monumental and robust type of modern Gothic now practised in church building. We published all the drawings and commented fully on the design at the time of the competition.

1758, "Church of the Holy Trinity, Upper Chelsea"; Mr. J. D. Sedding. Like most of its author's churches, this is a very original design. It is shown in a freehand pen line drawing. The general conception appears to be suggested by King's College Chapel, with aisles added, and treated with a different manner of detail. Large octagonal turrets flank each end of the nave, the masonry treated in dark and light bands, the lower story plain, the upper portions enriched with bold panelling or "mullioning" (if we may coin the word), which is continued above the west window. The window is a large one, of the Late Decorated type of tracery. The turrets end in open lanterns, recessed a little back, with pinnacles carrying up the line of the lower wall. The aisles have lesser octagonal turrets at the angles, with open lanterns, but no panelling. The parapet is battlemented, with pinnacles at intervals. The whole is rich and original in effect.

1759, "Design for a Town Church"; Mr. Amos Hall. A shaded Indian-ink drawing of a design in a very flat type of Gothic, few mouldings, and flat bands in string-courses. We do not admire the detail, but there is some original and effective treatment in the upper portion of the tower.

1762, "New Vicarage at Wick, Pershore"; Mr. Aston Webb. A very pretty pen-sketch of a stone house (apparently) with cannon-ball finials on the gables, and mullioned windows placed in an accidental kind of manner, with the entry under a wide recessed arch. The charm of the drawing consists in its reticence, the slight free way in which it is touched, and the full value of white spaces of light recognised.

1764, "Graythwaite Hall, Windermere"; Mr. R. Knill Freeman. A brown-lined and slightly-tinted drawing of a modern Elizabethan house, to which every effort seems to have been made (and successfully) to impart the feeling and appearance of an old building of the date supposed; even the drawing seems handled to assist this illusion. The elliptical sweep of balustraded terrace in the foreground is a pretty feature in the surroundings of the house. No plan is appended, and it is therefore impossible to judge of the practical suitability of the house; as a specimen of the revival of the quiet and picturesque style it imitates, it is very pleasing and complete.

1,765, "The Imperial Institute"; Mr. T. E. Colcutt. This is the same view of the intended building which we published, but in a different stage of the drawing. It is a large, finely-executed, and delicate pen drawing, and shows what may be called, in spite of its large scale, a very "pretty" building,—that is the impression it gives. That treatment of a building with thin pilasters just relieving the surface, effective enough on a small scale, is certainly not the kind of treatment to promote grandeur and dignity of effect. Tasteful and refined the design is, but it will produce no effect proportionate to its size and cost.

1768, "Church of the Holy Trinity, Upper Chelsea: Interior"; Mr. J. D. Sedding. This is the interior of the church the exterior of which we have already noticed. It is a very effectively-executed pen-drawing, looking towards the east end, where there is a similar large traceried window to that at the west end, filling up the whole space over the chancel, and shown through a shimmer of light very cleverly managed by the draughtsman. There are lofty plain octagonal piers, unmoulded, the outer chamfer plane of which runs up and is turned as a lofty wall-arch over the clearstory windows; the ground-story arcade abuts against centres of the piers, and solid transverse arches are carried from each pier across the aisles, forming supports to a series of bays wagon-vaulted at right angles to the length of the nave. The nave roof is vaulted (quadripartite), and the place of the triforium is filled by a series of niches and canopies with figures, forming a broad band of rich decoration at this point. From the plan it is seen that the aisles are narrow ones for passage only, as indeed would be inferred from the view; there is a chapel extending the area of the church on the north side. The chancel is the same width as the nave, forming one long compartment; in fact, it is a collegiate chapel with aisles added. The interior is not quite so strikingly original as the exterior, but it is a fine bold design, with some very effective features.

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## CORNICES AND STRING COURSES.

### ARCHITECTURAL ASSOCIATION.

THE thirteenth ordinary meeting for the present session of this Association was held on the 4th inst., in the meeting-room of the Royal Institute of British Architects, Mr. John Slater, B.A. (President), in the chair.

The following new members were elected, viz., Messrs. J. Chadwick, G. Baines, T. G. Tiarks, H. Simpson, A. H. E. Woods, H. Hooper, F. de Jong, J. J. Freeland, and R. Dickinson.

Votes of thanks were passed to Messrs. Farmer & Brindley, for permitting the members to inspect their workshops, and to Mr. Barnes, their manager, for his kindness in explaining everything in the shops, and keeping the machinery at work.

Mr. W. Burrell (Hon. Librarian) announced several donations of books to the library, and votes of thanks were accorded to the several donors.

Mr. H. H. Statham next read a paper on "Cornices and String Courses." He said:—

It is a useful thing sometimes to pause and consider the origin and meaning of some of the features we are in the habit of using as common or indispensable elements of architectural design. In linking together cornices and string-courses with this object, I take the title as including generally the horizontal moulded members of a building; but there is really a more complete connexion between the two words than appears, for, in fact, the string-course, as used in Mediæval architecture, is a direct descendant from the Classic cornice, and only arose out of the use of the cornice form in subordinate positions. In Egyptian, Greek, and other ancient architecture the string-course, in its modern sense, is scarcely found at all. The small moulding at the top of the architrave in Greek architecture was really the cornice of the architrave; the moulding under the Parthenon frieze is the capping of the plain wall and defines the panel for the sculpture;

but we find nothing in antique architecture like the use of string-courses purely to divide up a building into heights or to influence its architectural expression.

In looking into the subject I naturally commenced, as every right-minded man would, with a reference to the "Dictionary of Architecture," and there found *cornice* defined as "the capping formed to protect the body of the wall from wet, and to throw off the rain-water from the roof beyond the face of the building; this capping in hot countries received a considerable projection for the sake of its shade as well."

It may be observed in regard to the latter remark that in Egypt, Persia, and Assyria, which are all hot countries, the prevalent forms of cornice were of slight projection; and that of Egypt is the most important cornice of antiquity. But, independently of this question, the definition of the Dictionary is too utilitarian. Cornice is the Greek "κορωνίς," the meaning of which is (1) anything curved; (2) a wreath or garland; (3) a flourish with a pen at the end of a book; and (4) the finish or completion of anything. The Greeks, who were very logical in their use of language, would not have adopted the word κορωνις unless they had attached that kind of meaning to the cornice, as the crown or finish of the architectural design. There may also have been some connexion between κορωνίς as "a curve," and the shape of the Egyptian cornice, which was the precursor of the Greek one, but either way the idea implied in the original work is that of a crowning member, and this really distinguishes it from the string-course, which is what ladies call, in lace or embroidery, "an insertion"; and if we begin with the consideration of the cornice, we shall find ourselves merging into the string-course later on.

The typical general sections of cornices may be pretty well included under the forms shown in fig. 1: the large horizontally projected form A; the simpler cornice filling up an angle of 45°, B; the cornice with a steeper raking line C, characteristic of a great deal of Oriental and Saracenic building; and the cornice projecting slightly but with considerable vertical extension, D. These general outlines are susceptible of very varied treatment, but in fact the history of the cornice rather impresses one by the amount of repetition of similar forms which occurs.

The typical Egyptian cornice, fig. 2, is little more than what the modern plasterer calls a "single moulding," on a large scale; it may be scheduled under Class B. The paucity of mouldings in Egyptian architecture is remarkable; they really seem to have no mouldings but the *torus* and *cavetto*, which may be partly accounted for by the difficulty of moulding in such a material as granite, as is indicated in such groups of mouldings as figs. 6 and 7, which, like the Egyptian lettering and hieroglyphic symbols, are merely sunk in intaglio in the surface of the granite. There is a reflex curve found in crestings over the *cavetto*, as in fig. 3, but mostly as a divided ornament and not a continuous moulding, occurring also in Phœnician work (fig. 5). But the large *cavetto* termination played a great part in antique cornices; it was a prevalent feature in Phœnician work, as in figs. 4 and in figs. 10, 11, the latter a late cornice from the neighbourhood of Carthage, probably about 100 B.C., continued with details of a Greek character. The use of this large crowning moulding over door-heads, so frequent in Egyptian work, shows its influence in various other places, as in the Persian example (17), and that from Selinonte (18) (600 B.C.?); and the Greek door cornice from the Erechtheion (19) and the Roman form (20), though here the curve has a double flexure, show the same general idea, no doubt traceable to the Egyptian prototype, of a large crowning curve over smaller and flatter mouldings. This Egyptian *cavetto* is obviously a stone (or granite) form: we can hardly trace it to any utilitarian origin. Quatremère de Quincy, who made a special study of the architecture of Egypt, in his very valuable and suggestive work, observes: — "We find in Egyptian architecture many details for which no reason can be given except that kind of chance which suggests to men the choice of certain forms, according to the pleasure of their eyes, and without any regard to their resemblance to other objects."

Perrot and Chipiez, in their work on Phœnician architecture, give another not uncommon form of single mould cornice, as shown in 13 and 14, bearing a resemblance to a well-known Classical moulding, except that, as seen at E (14), the convex of the curve is flush with the fillet above, instead of being recessed from it. The employment of this moulding in the sketch (13) of a tomb at Amrit, probably earlier than any known Greek remains, is curious, as it is really an early example of a string-course and not a cornice, of portentous dimensions, however, as the whole erection is about 20 ft. high. Assyria shows us a single-moulding cornice of the B class, but of slightly convex outline, as shown in 8; and in 9 (both these being from Assyrian sculptured slabs) there is a rather rude attempt at that grouping and contrast of larger and smaller mouldings which became so important a consideration in the designing of the Classic cornice. These are probably eighth century B.C.

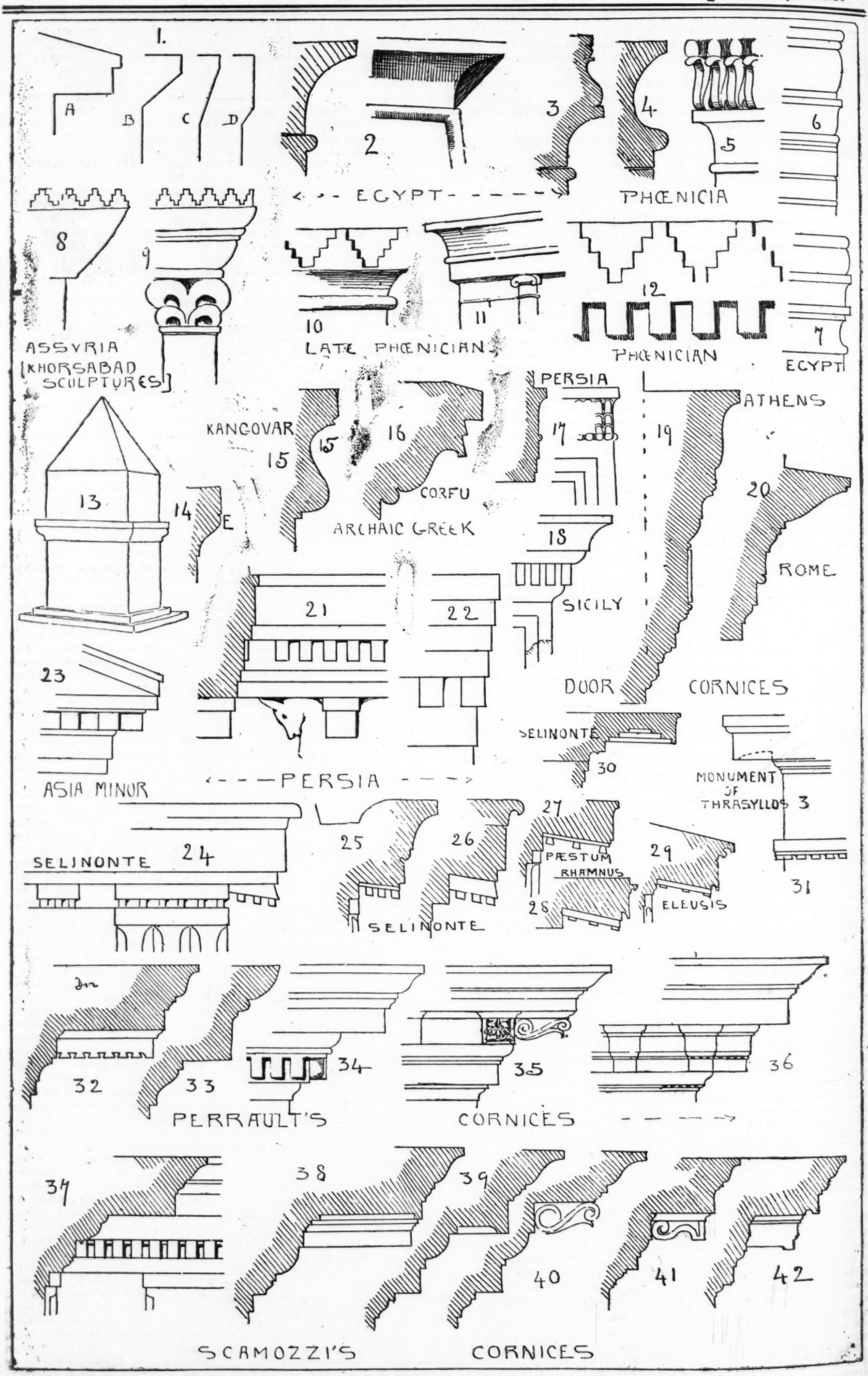
All these are obviously stone forms, and present none of that repetition of cube-shaped features which was the leading characteristic of the cornices derived from a wooden origin, and showing reminiscences of the ends of roof timbers. In some instances, as in the Phœnician and Persian examples, 12 and 22, this might be supposed to arise from the employment of heading bricks as supporters to the continuous courses above them, but in the rock-cut Persian façade at Naksh-i-Rustam (21) (say, 500 B.C.?), we see an obvious wooden origin in the large projecting beam below, carried on a horse-head capital, and the smaller "dentils" showing the ends of the rafters above, and the wooden origin of the cornice from Telnissos in Asia Minor (23) is almost equally obvious. Asia Minor, as is well known, is the ground on which the evidences of the wooden origin of the Greek cornice is most abundant; in some cases, as in the examples now in the vestibule of the British Museum, the whole represented structure is evidently timber done into stone. The connexion of these forms with the Doric cornice is obvious; but this does not imply the wooden origin of the Doric style generally. As Lesueur says,—"It was the combination of a wooden roof superimposed on Egyptian architecture which developed the Greek entablature.* The cornice is the only portion imitative of a wooden construction in Doric architecture. It must be observed also that the mutules do not reproduce the thin dimensions of the wood. The projection of the rafters beyond the wall-face gave the idea only of the mutules, but the Greeks judiciously gave to the latter the heavy proportions of stone, in order to harmonise with the robust ensemble of the order. In the cornice of the temple C at Selinonte, the mutules above the metopes, recalling the thin dimensions of the rafters, produces a very bad effect" (fig. 24). This incident in the Selinonte Temple is a significant one, and takes us as near, perhaps, as we can get to the origin of the Doric cornice. There can be no reasonable doubt that the slope of the soffit of the Doric cornice originally represented the slope of the rafters projecting over the roof. Mr. Garbett has combated this idea ("Principles of Architecture"), because in the Parthenon the slope of the soffit is not identical with that of the roof, and he ingeniously accounts for it by supposing that the object was to lessen the apparent spread of the mutules at the angles, when the cornice is seen in perspective from below. But the older cornices, at Selinonte and elsewhere, have mostly a greater slope than that of the Parthenon, and the probability is that the Greek architects of the great age modified the slope of the soffit from a feeling of the weakness of the section of the cornice when it was too much cut upward at its junction with the wall. This appearance of weakness is very obvious in the sections from Pæstum and Rhamnus (27 and 28); in cornices of lesser projection, as those from Selinonte, shown at 25 and 26, it is, of course, not so marked. It should be observed, however, that as late as the time of Vitruvius, if we take him as representing the opinions of his day, the former origin of the mutule and the sloping soffit was still kept in view; for he specially mentions this as the reason for sloping the soffit.

The cornices of the Selinonte temples, which are all prior to the great age of Athenian Doric, afford curious examples of the various experiments, as they may be termed, which were being made with the cornice at this archaic period of Greek architecture. One of them (30) is without guttæ, an almost solitary example, I imagine, in Greek Doric, as far as we now know it. It is curious that the cornice referred to by Lesueur, with the narrow mutule over the metope (24), and which ought, on this account to be regarded as the earliest, the one in which the transition from wooden to stone forms is still incomplete, shows in section (26) a form of crowning moulding which is characteristic of the fully-developed Greek Doric. The section 25 is notable as showing so very strong a resemblance in its two upper members to the old Egyptian cornice (2); it is the Egyptian cornice moulding set on the Greek corona and mutule. That of Pæstum (27), probably later than the last mentioned, though in what is called the Archaic Period, shows again a modification of the Egyptian *cavetto*, only here in a flattened and more vertical form, as in the Persian example (17). The cornices from Rhamnus and Eleusis (28, 29), of later date, show the manner of providing an effective drip by cutting up under the principal fascia of the architrave, as in the Parthenon cornice also. In the Parthenon and other examples this drip is found near but not at the foot of the fascia, leaving a second narrow fascia in the rear of the principal one, and this was both the most usual and most effective arrangement, giving a thin line of dark shadow along the lower portion of the corona, certainly more effective than the section shown at 29, where the drip only appears as a channel in the soffit of the corona.

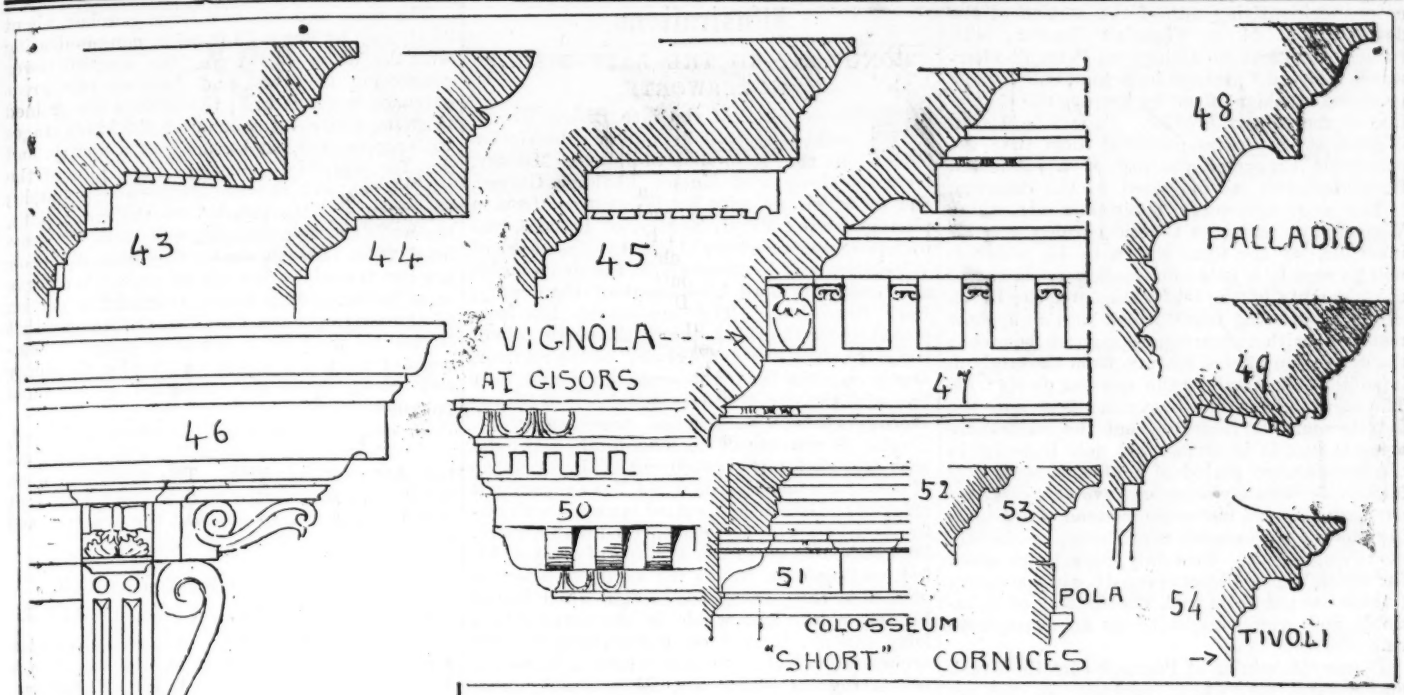
The beauty and refinement of the Greek mouldings, in the cornices as well as elsewhere, was the subject of the last paper read here, and no one could admire this more than I do, but it is a question whether the stereotyped arrangement of mutules and guttæ in the Greek cornice is worth the same admiration. Mr. Ruskin has asked the question, not without reason, whether any one was ever the happier for designing triglyphs. The query might be extended to mutules and guttæ, surely. I am a devoted admirer of Greek Doric architecture, as far as the architrave. The column and capital seem to represent ideal perfection of design and execution; but I do not think the Greeks evinced the same expressive shaping power in their use of the materials from which the Doric entablature is formed. It expresses correctly, perhaps rather too correctly, the timber origin of this part of the structure; when the marble construction had been fairly and fully adopted, it was time to quit the too close reminiscences to the wooden forms, and it has always appeared a surprising thing to me that a people so refined in their perceptions as the Greeks, and who had elaborated so perfect a masonic architectural feature as the Doric column, should have been content to go on repeating in marble such mere survivals of another construction as the triglyphs and mutules and guttæ, with no further attempt to refine and modify them into such a form as would harmonise with the purely marble style of their column. I commend to the ambitious spirits in the Association, as an object worthy of their efforts, the improvement and remodelling of the Doric entablature!

Coming to the cornices of the orders, as usually accepted, we find little left of the wooden origin which is so conspicuous in the Doric cornice, the only directly wooden feature being the dentils. The modillions of the Corinthian cornice no doubt sprang originally from the timber forms; but they have developed into a form quite expressive of stone construction; they have lost the slope of the soffit, and appear what they really are,—brackets to support the extended corona and enrich its soffit. This transformation was also made in the Roman Doric, as far as the cornice is concerned; the Romans retained the triglyph, and misplaced it so as to leave it without even the meaning which it had in the Greek Doric; but they did away with the slope of the soffit, and altered the mutule in its proportions into a stone bracket, —transformed it, in fact, into a modillion. In so far they made a distinct advance on the Doric cornice. The Corinthian cornice, as seen in such examples as the Jupiter Stator, is a real κορωνίς, a decorative crown to the design, rich in effect and entirely in keeping with a masonic structure. As to the special adaptation of the cornice of each order to its substructure, this can hardly be recognised as having been deliberately worked out by the ancients on any principle,

* A pictorial treatment of this idea is to be seen in the front of the Temple of Æsculapius in Mr. Poynter's picture, "A Visit to Æsculapius."




*Diagrams illustrating Mr. H. H. Statham's Lecture on Cornices and String-Courses.*




*Diagrams illustrating Mr. H. H. Statham's Lecture on Cornices and String-Courses.*

except the general one of giving a heavier and more bulky appearance to the cornices of the heavier orders, and a lighter appearance and greater multiplication of parts to those of the more ornate and graceful orders. Taking Greek examples, it may be observed that the Doric cornice is mostly given a large and deep corona and a small and simple crowning member, while in the Tower of the Winds, for instance, the corona is smaller and the crowning member larger and more flowing in its outline. In the monument of Lysicrates, though the actual crown moulding is of the same small proportions as in the Doric, it is extended and embellished by the decorative cresting which forms the real crown of the cornice, a kind of feature which would be quite out of place in a Doric cornice. Vitruvius and some of the Renaissance architects following him rule that the dentil is proper to the Ionic cornice, as the modillion to the Corinthian, but there seems no reason beyond custom why it should be so, and indeed Vitruvius very frankly says that if parts belonging to one order are transferred to another, "the eye will be offended, because custom otherwise applies these details," and he seems to think it a sufficient reason. In another passage, however, he does endeavour to reduce some of the details to a logical procedure, as thus:—

"As in works of the Doric order triglyphs and mutuli were first used, so in Ionic works the use of dentils was first introduced; for as the mutuli bear a resemblance to the projecting feet of the principal rafters, so, in the Ionic order, the dentils imitate the projection of the common rafters. Hence the Greeks never placed dentils below the mutuli, because the feet of common rafters cannot be below those of principal rafters.* The ancients, for a similar reason, neither approved nor used mutuli nor dentils in the cornices of their pediments, because neither principal nor common rafters tail on the front of a pediment, neither can they project beyond it, their direction being towards the eaves"; and he adds, "that cannot be correct in a copy which would be impossible in the original."

That gives a sufficient reason for not having dentils below the mutules in the Doric cornice, but not for their omission above, nor for their introduction in the Doric cornice, where they are always below the corona. In regard to the pediment, it is true that the mutules are omitted in the raking cornices of the Greek Doric, but they are carried all round the horizontal cornice at the ends, with the same slope as at the sides, so that here Vitruvius, as in some other cases, advances theories as to the practice of the Greeks which their executed works do not bear out, and it seems probable that Vitruvius had not personally examined the works of Greek architecture *in situ*. In his remark, however, that the apparently vertical members of cornices should be inclined forwards to prevent their appearing to slope backwards from the effect of perspective, he represents the practice of the Greeks as shown in the Parthenon, though it does not appear that the Roman architects troubled themselves about this refinement. In regard to this question of the perspective effect of the cornice, Pennethorne says that the Greeks studied the proportion of their cornices, not as seen in elevation, but in regard to the entire visual angle occupied by them as seen from below, including the soffit of the corona, or rather the space from the bed-mould to the lower angle of the corona. Whether this was so or not, the remark is suggestive as to the importance of considering the design of a cornice from this point of view, seeing that a cornice which looks well proportioned to the substructure when drawn in elevation may appear much heavier when seen in execution from the ordinary position of a spectator on the ground level.

I have collected here a few of the cornice sections of the orders as designed by some of the leading men of Renaissance period, which are of interest as representing the variations of Classic types which they made, and the various effects produced by a different grouping and proportioning of the same type of mouldings. Alberti lays it down that the greatest projection of a Classic cornice should be the same as its greatest height, which may be approximately true in one sense, but is a decidedly mischievous rule if it leads to giving the cornice a general outline approximating to the angle formed by the oblique diameter between height and projection. To have marked character a cornice should have its predominating lines either horizontal or vertical: a cornice of which all the salient angles touch a line on an angle of 45° has neither the one character nor the other. Perrault's Doric cornice (32), with its boldly-projected corona, is in this sense a powerful and characteristic cornice, emphasising the line of level projection. He, it will be seen, prefers to ignore the slope of the mutule and corona altogether, as did the Romans generally; this materially alters the character of the cornice originally called Doric, but it seems a more suitable section for a masonic style. A similarly bold projection is seen in one of Scamozzi's Doric cornices (38), but with a much heavier bed mould; there is not so much character in this as in Perrault's, owing to the more even proportion of mouldings above and below the corona, but Perrault's cavetto bed-mould is, perhaps, rather weak in effect for the situation. 33 is Perrault's Tuscan cornice. Of course the so-called "Tuscan order," however it came by its name, only means an order of exceedingly plain and massive character; this one of Perrault's is rather deficient in character, with the defect that the projection of the corona is almost exactly equal to its height. It has more the character of an impost or surbase cornice than of a main one, and the crown mouldings show two convex members in contiguity,—not a good method of designing. Convex or concave mouldings should be opposed and contrasted by angular members. Nos. 34, 35, and 36 are respectively Doric, Corinthian, and composite cornices, according to Perrault. The two latter are good examples of the variety in effect in cornices of about the same scale. In the Corinthian the corona is kept very small and light, so as not to overweight the modillions; in the latter the cornice and crown moulding are much larger in proportion, and the modillions proportionately deeper and stronger. This is a powerfully-designed and effective cornice. Scamozzi takes a greater degree of licence in his treatment of the embellishments of the cornice. No. 37 is a Doric of his, in which he would have shocked Vitruvius by introducing dentils. The upper portion of this cornice is certainly too light in proportion and too great in projection for a Doric cornice, unless the character of the substructure was to be much modified from what is generally understood as Doric in character Nos. 39 and 41 are both Ionic cornices, in the latter of which Scamozzi has committed the immorality of introducing modillions, even as he introduced dentils in the Doric cornice. No. 39 has the defect of being too regularly oblique in its general line, and the projection of the crown mouldings would seem portentous when seen at the angle, though not more so than some Roman examples,—the inner cornice of the Pantheon, for instance. The same objection applies to his Corinthian cornice (40); but another Corinthian cornice of his (42) is superior to this in profile, the corona having more effect from its horizontal projection contrasting with the comparatively vertical line of the lower mouldings of the cornice. Nos. 43 and 45 are Vignola's two Doric cornices, in one of which there is again a reminiscence of the sloped soffit of the Greeks. Like Perrault, Vignola prefers to keep the mass of the cornice above the soffit of the corona, leaving a small bed-mould. His method of forming a drip (a utilitarian feature much neglected in some of these cornice sections of the Renaissance masters), as seen in 43, is the same as Scamozzi's, cutting a small channel just at the edge of the soffit,—not a good or artistic way of doing it. The cornice should appear so designed as to free itself from water by its natural lines, without presenting grooves and channels which have nothing to do with its design. The same device is seen in Palladio's Doric cornice, however (49), in which also it will be observed that the slope of the soffit is restored in the most pronounced manner, to the same extent as in an early Sicilian cornice. Vignola's composite cornice (47) is a powerful cornice, in regard to the strong foundation given by its large ovolo and heavy dentils in the lower members; not using the modillion, he seems to have thought a very moderate projection of the corona sufficient, and in this case he designs it so as to have a

* In some Renaissance cornices, as in the example fig. 50, there seems to have been an attempt to comply with the reasoning of Vitruvius, by indicating dentils on the face of the corona, the modillions being below.

natural drip arising out of the section of the design. No. 44 is Vignola's Tuscan, with exactly the same mouldings as Perrault afterwards adopted,* perhaps from him, but Vignola produces a bolder effect by keeping the projection of the corona greater. Palladio's Tuscan is given at 48,—a less powerful form than the other; he suggested the use of a rusticated frieze under it, as indicated in the diagram.

The most noteworthy thing, however, which Vignola did with the Classic cornice was his invention of the form shown in 46, which it will be seen is a new combination made out of the elements of the Corinthian and the Doric, he triglyph being transformed into an upright modillion, with a square metope space between; the derivation of this feature from the triglyph is sufficiently noted by the grooves on its face. The cornice is rather heavy in effect, and the details might be improved, but the remarkable thing is that it is almost the sole instance in the Renaissance period of an architect setting himself deliberately to work to evolve something new from the old materials, instead of contenting himself with merely reproducing or slightly modifying them. Certainly, this is an effort for which Vignola deserves credit with posterity (which has paid him with the flattery of imitation), and which ought to be an example to us.

It was the opinion of Perrault that the Greek entablatures (of which, perhaps, he did not really know very much) were too small in proportion, and that the Romans increased them to a too large proportion. Fergusson, on the other hand, complains that the French Renaissance architects always made their crowning cornices too small, proportioning them to the upper order and not to the building, an accusation which he might have brought against some of the Italian Renaissance architects also. But this is the difficulty inseparable from using orders one over the other. If the upper cornice is proportioned to the order it is too small for the building, and *vice versâ*. The only really effective way to employ the Classical cornice to a building of several stories is to knock away the orders altogether, trust to fenestration, and make the whole wall of the building the order, and the cornice the crown to that. Then the cornice can be used on a grand scale, and without overweighting any of the other details, as it is done in such buildings as the Riccardi, Strozzi, and Pitti Palaces; and that is the only rational way of employing the Classic cornice for buildings of more than one story. As long as superimposed orders are retained, there will be this discrepancy, in the uppermost cornice, between the proportion required by the order and the proportion required by the building.

The diagrams which I have classified as "short" cornices represent a type in which the general design of the regular cornice is maintained, but either some member is omitted,—as at 53, where the fascia of the corona does not appear,—or the projection of the cornice is reduced, as in 51, 52, and 54. The latter is a genuine main cornice; but this cutting short of the cornice was one method adopted by the Romans, and from them by the Renaissance designers, of subordinating a secondary cornice to a main one. Thus, in the Attic cornice of the Roman triumphal arches, the same groups of mouldings are usually there, but the projection of the corona is cut short, and a similar treatment often occurs in surbase cornices. In the case of the amphitheatres of the Colosseum and Pola, this reduction of the cornices is a significant point; it shows that the Romans were beginning to feel how the design was overweighted by these cornices in successive stories, and were, in fact, without knowing it, taking the first step towards reducing the cornice to a string-course.†

**The Nineteenth Century Art Society.**—Saturday, the 12th inst. (to-day), has been appointed for the private view of the summer exhibition of this Society, at the Conduit-street galleries, and the exhibition will open to the public on Monday, the 14th inst.

* This is the chronological order of the Renaissance architects mentioned here: Alberti (fifteenth century); Barozzi of Vignola (sixteenth century); Palladio (later in the same century); Scamozzi (a little later than Palladio); Perrault (about the middle of the seventeenth century).

† The remainder of the lecture, with a report of the discussion which followed, in our next.

# Illustrations.

## MONUMENT TO THE LATE BISHOP WORDSWORTH.

THE memorial of the late Bishop Wordsworth, erected by public subscription in the retro-choir of Lincoln Minster, from the designs of Messrs. Bodley & Garner, and of which we give an illustration, from a photograph by Mr. G. Hadley, of Lincoln, was unveiled on February 11th, by the Earl of Winchilsea and Nottingham, in the unavoidable absence of the Lord Lieutenant of the county, Earl Brownlow. The monument has been placed under the third arch on the north side of the retro-choir, or "angel choir," of the minster, nearly opposite the great south door, and in a line with the site of the former shrine of Bishop Wordsworth's distinguished predecessor, St. Hugh. It consists of an altar-tomb, set round with canopied niches, each containing a statue of one of the apostles, on which lies a recumbent effigy of the late bishop, vested in a cope with embroidered orfrays, his head covered with a mitre, his hands clasped in the attitude of prayer, his feet resting on a dragon the mouth of which is pierced by the point of the crozier which lies at his left side. The whole is surmounted by a lofty canopy, formed of eight richly-foliated arches, under elaborate ogee canopies, framed in tall triangular pediments, all profusely ornamented with crockets and finials and other carving, in the best style of the Edwardian period. The plan of the memorial is a very elongated octagon, the angles being cut off in a manner corresponding to that of the well-known tomb of Gervase Alard, at Winchelsea. This somewhat unusual arrangement very happily breaks the flatness of the face of the memorial, while the gables and other architectural features presented to the eye at an angle, create a play of outline which is not only very pleasing, but also adds greatly to the general richness of the effect of the composition. At each of the eight angles rises a panelled buttress, broken by three pedimental canopies, and terminating in a tall pinnacle of great richness. The central part of the canopy, which rises in a long gabled roof, running east and west, is surmounted by series of four delicate fenestrated openings, each of two lights, divided by pinnacles, from the centre of which rises an open square tabernacle, supported by flying buttresses, with pinnacles at the angles, and terminating in a lofty spirelet richly crocketed. This tabernacle contains a statue of Our Lord in the act of benediction, with the volume of the Bible under His left arm. While the idea of the monument, as has been remarked, is taken from the Alard tomb at Winchelsea, the general form of the arches and canopies that surmount them, as well as the ornamentation generally, has been suggested by the fragments of the canopies of the Burghersh tombs in the same part of the cathedral. The architectural portions of the memorial are of fine-grained Ancaster stone; the effigy being carved in stone from the quarries of D'Aubigny, near Caen.

The whole of the work has been most ably executed by Messrs. Farmer & Brindley, who have spared no pains in carrying out the design in the most delicate and refined manner. The bishop's effigy and the statuary generally are the work of M. Guillemin, to whom we also owe the sculptures of the St. Paul's reredos. The calm dignity of the bishop's figure is admirable, and the likeness is such as to satisfy the critical eyes of the members of his own family. The verge of the altar-tomb bears on a brass label the following inscription:—CHR. WORDSWORTH, S.T.P. XVI. A. EPS. LINCOLN: SCRIBA DOCTVS IN REGNO CAELI: CATHOLICAE VERITATIS PROPVGNATOR: SCHOLARVM INSTAVRATOR: GREGIS ET PASTORVM PATER. N. OCT. D. XXX. A.S. MDCCCVII. OBD. D. MART. XXI. MDCCCLXXXV. VENI. DNE. JESV.—AMEN.

## PARISH CHURCH OF ST. MARY, HORNSEY.

WE give an illustration of this fine and thoroughly English-looking parish church, which is in course of erection from the designs of Mr. James Brooks.

The church is to seat 1,260 persons (all on the ground-floor). The committee received the promise of two large donations, on the express condition that the church should be a fine and architecturally effective building; a kind of condition which we like to hear of in these days of "cheap churches."

The west end has two large porches, about 25 ft. long by about 13 ft. wide, communicating with the aisles and nave, the western tower connecting the two, and forming one great entrance to the church; the ceilings are groined in stone, staircases connecting the lower stages with rooms over, to be used as a library, and one for parochial purposes. The plan of the church, as will be seen, is exceedingly simple; the nave and the chancel are the same width, the walls the same height, the roofs the same level from east to west. Opposite the choir are two transepts, the one to contain the organ on a platform, with space under for a portion of the congregation, the other so arranged that it can be used for a morning chapel. Eastward of the transepts are vestries for the clergy and choir, which are connected by a ground passage.

The walls are to be built in stone, and faced, both externally and internally, with stone from the Ancaster quarries. The roofs are open timbered, that over the nave to one design, that over the chancel to another, the transept and aisle roofs also differing in design.

## NEW CHURCH OF ST. ANDREW, GARRATT-LANE, WANDSWORTH.

THIS building is about to be commenced upon a site presented by Magdalen College, close to Earlsfield Station upon the L. & S. W. Railway, where a new district has recently been formed, with a population of some thousands, mostly of the working classes.

The church is necessarily very plain, funds being exceedingly limited. The walls are of brick, faced principally with red; the roofs, covered with Broseley tiles, are internally of tie-beam construction, ceiled at the collar. The stone is Doulting, the floor of wood blocks.

On plan the church consists of nave, 91 ft. by 30 ft., with side aisles and transepts, the chancel being 40 ft. by 25 ft., also with north and south aisles, the latter forming side chapel. Seating accommodation for 780 is provided. The choir vestry is large, and will be used as a parish room. The cost will not exceed 6,500*l*. The architect is Mr. E. W. Mountford.

## STABLES, DIDSBURY, NEAR MANCHESTER.

THESE stables provide accommodation for three horses, and a sick-box in addition. The accompanying plan shows the arrangement. A loft is provided over the entire building. The ventilating-turret provides also space for corn-bin, shoots, &c. The stable itself is lined with grey and white glazed bricks, and the ceilings throughout are of pitch pine, being, in fact, solid 3-in. planks tongued with iron, and forming the floor to the loft, joists being dispensed with.

The stables have been designed to harmonise with a house erected for Mr. Rogerson some years ago.

Messrs. W. Southern & Sons, of Salford, were the builders, the contract price being 730*l*. The architect is Mr. John Langham, of Manchester.

## NEWMAN MANSIONS, W.

THE view we publish of Newman Mansions, Oxford-street, of which the first portion is already completed, represents one of several rebuildings which are taking place on the Berners Estate, Oxford-street, from the designs and under the superintendence of Mr. E. C. Robins, F.S.A., the Surveyor to the Estate.

The ground-floor and basement and four stories of warehouses in the rear, opening into Perry's-place-yard, are let in three groups, and the three floors of residential flats over the shops in front, with twelve rooms in each, are reached by a staircase of Massa Carrara marble on fireproof core, the walls being lined with tiles and the door openings, &c., with faïence, modelled and fixed by Messrs. Simpson, Messrs. Diespeker & Co. having laid the mosaic paving on the landings.

Messrs. Burton's premises have to be rebuilt, and they have already taken possession of the first of the three new shops.

The work, so far, has been done at the expense of Mr. Chick, lace merchant, of Newman-street.

**The Italian Exhibition.**—This exhibition, which is held in the buildings and grounds occupied last year by the American Exhibition and "Wild West" show, is to be opened this Saturday, May 12.

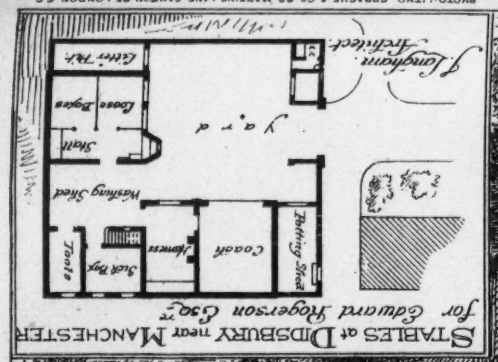
NEWMAN MANSIONS.—M

PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST., LONDON, E.C.

...S.—M... C. ROBINS, F.S.A., ARCHITECT.

PHOTO-LITHO. SPRAGUE & CO 82, MARTINS LANE, CANNON ST, LONDON, E.C.

STABLES at DIDSBURY near MANCHESTER
for Edward Rogerson Esqr



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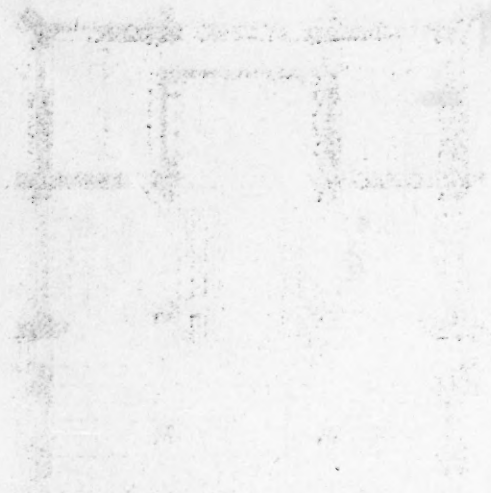
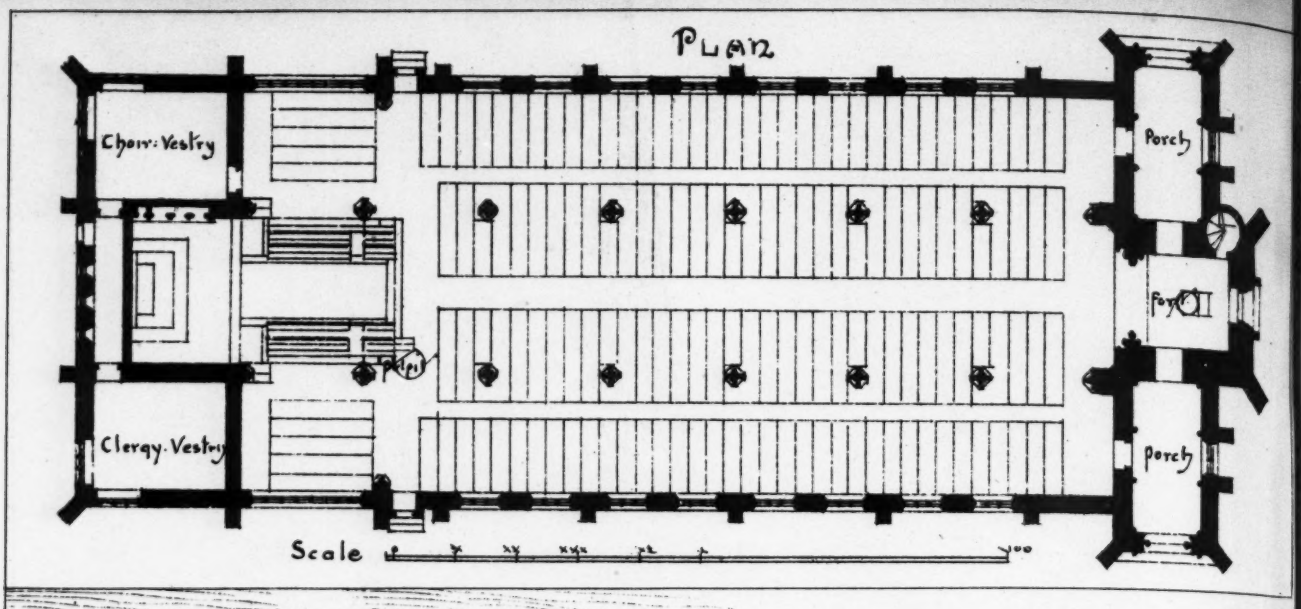
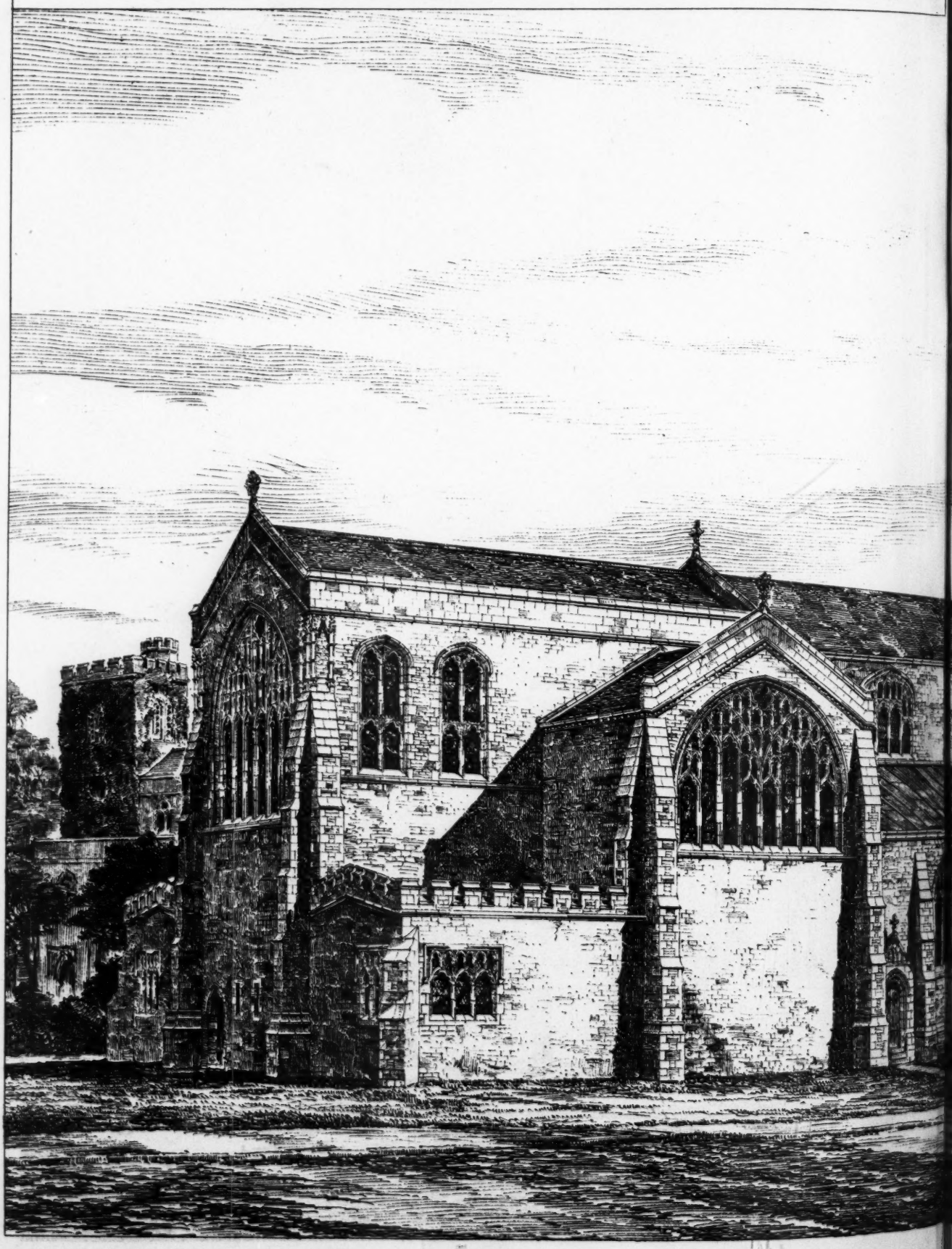




PARISH CHURCH OF ST. MARY, HORNE

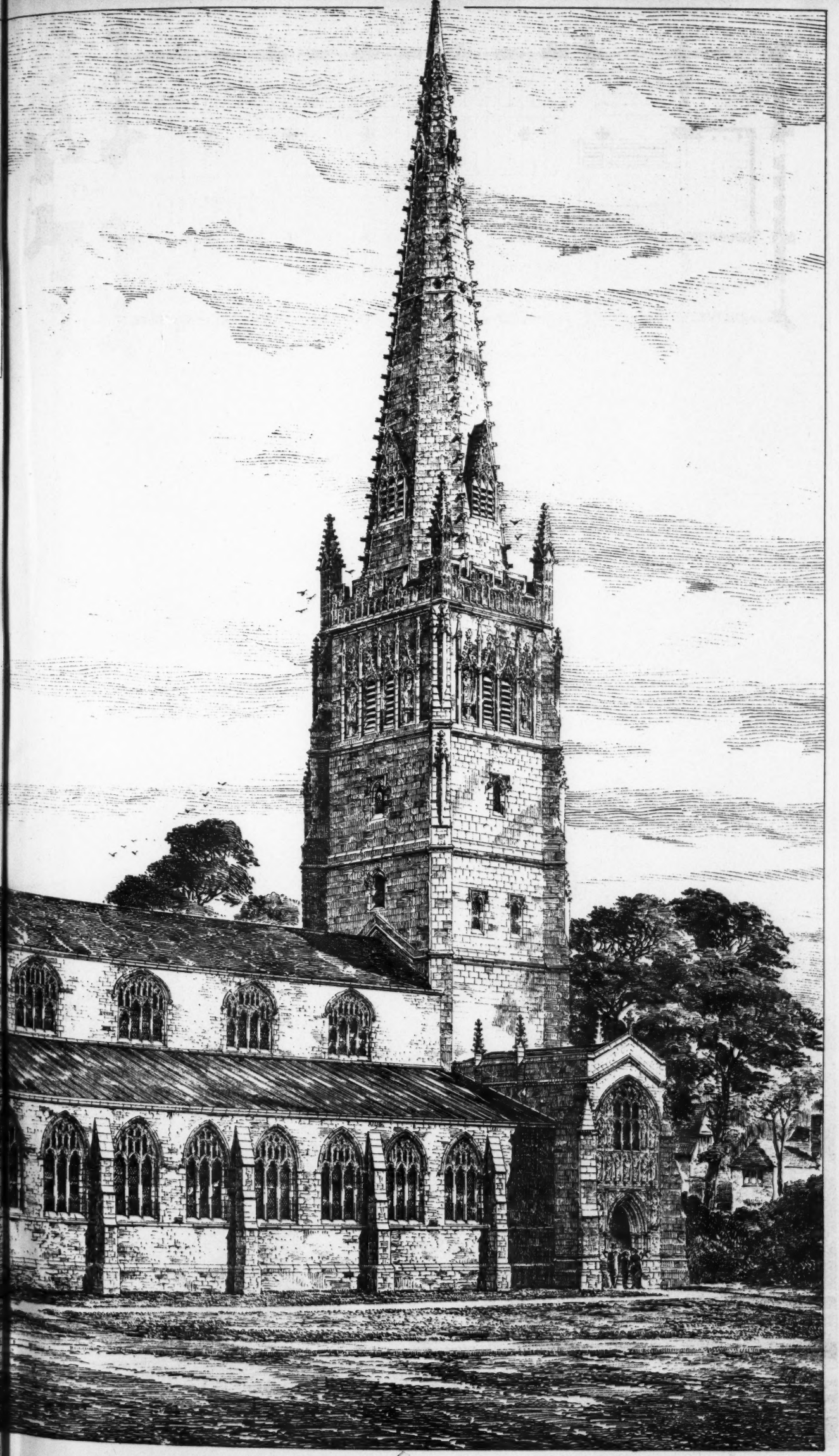


PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

HORNE—Mr. James Brooks, F.R.I.B.A., Architect.

*Photo-print Waterlow & Sons Limited, London.*

MONUMENT TO BISHOP WORDSWORTH: LINCOLN CATHEDRAL.—Messrs. Bodley & Garner, Architects.

## THE LATE MR. R. P. PULLAN.

WE briefly announced last week the death of Mr. Richard Popplewell Pullan, F.R.I.B.A., F.S.A. We now give a few particulars of his career, which was chiefly devoted to literary and archæological pursuits. Of late years he had taken an active part in the annual meetings of the Royal Archæological Institute, from which he will be greatly missed.

Among his executed works were the English churches at Baveno and Pontresina. The church at Baveno is an octagonal church of the Lombard type of Romanesque work, and was erected by Mr. Henfrey in the grounds of his villa on Lago Maggiore.

He submitted a design in the competition for the Memorial Church at St. Petersburg on the spot where the late Emperor Alexander II. was killed in 1882. The design was in the pure Byzantine style, with the exception of the pyramidal spire surmounting the detached tower. Mr. Pullan also submitted two designs for the church erected in Constantinople in memory of the officers and soldiers who were killed in the Crimean war. The late William Burges, A.R.A., received the first premium in this competition, but the late Mr. Street, R.A., who obtained the second premium, carried out the work. In 1856 there was an international competition for a cathedral to be erected at Lille. Mr. Pullan, in conjunction with Mr. Evans, sent in a design which was highly spoken of, and received a silver medal, although the first premium went to Messrs. Clutton & Burges, the second to Mr. Street, and the third to M. Lassus, of Paris. Mr. Pullan also competed for the erection of the new cathedral at Truro.

Among other competitions in which Mr. Pullan took part was the abortive one for the Government Offices in 1857, the Liverpool Exchange, the Natural History Museum, South Kensington, Glasgow Municipal Buildings, and the Dublin Museum. His designs for these and other works are published in his "Studies in Architectural Style."

In 1856 he was commissioned by the late Sir Stephen Glynne to prepare plans for the restoration of Hawarden Church, Flintshire, which was a building in the Perpendicular style. Shortly after the plans were prepared and approved Mr. Pullan was appointed architect to the Boudroum Expedition, and during his absence in the East, Hawarden Church was burnt down, and Sir Gilbert Scott was called in to rebuild it. This he did in the Decorated style of the thirteenth century. Mr. Pullan, in the aforesaid "Studies," publishes drawings showing the alterations he proposed.

It should be added that, in conjunction with Mr. Heath Wilson, he prepared a design for the adornment of the dome of St. Paul's Cathedral. This design was the subject of a paper read by Mr. Pullan before the Royal Institute of British Architects in December, 1882.* It was of a marked architectural character, and was based upon the "Te Deum," which was thought by the proposers to be a more appropriate theme than the Apocalypse.

Mr. Pullan, in conjunction with Mr. Texier, was the author of the following works:—"A History of Byzantine Architecture" (Lond., 1864); and "The Principal Ruins of Asia Minor" (Lond., 1865). He was the sole author of "The Altar: its Baldachino and Reredos" (Lond., 1873); "Remarks on Church Decoration" (Lond., 1878); "Eastern Cities and Italian Towns, with Notes on their Architecture" (Lond., 1879); "Elementary Lectures on Christian Architecture" (Lond., 1879): this work was, as he stated in the preface, intended chiefly for the non-professional public; and "Studies in Architectural Style" (1883).

He assisted Mr. (now Sir) C. T. Newton in "A History of Discoveries at Halicarnassus, Cnidus, and Branchidæ," and he himself excavated the sites of the temples of Bacchus at Teos, Apollo Smintheus in the Troad, and Minerva Polias at Priene. An account of these excavations, with essays on the history and architecture of the temples, by Messrs. Newton, Fergusson, Penrose, and Watkiss Lloyd, will be found in vol. iv. of "Ionian Antiquities," published by the Society of Dilettanti in 1881.

As has been already mentioned, Mr. Pullan married the sister of the late William Burges, A.R.A., who survives him. Mr. Pullan edited and published, in 1883, "The Architectural Designs of William Burges," and, in 1885, "The House of William Burges, A.R.A." (1886).

* See "Transactions" of R.I.B.A., and *Builder* for Dec. 9th, 1882.

## THE GREEK THEATRE.

IN his second lecture, on April 27th, Sir C. Newton described some of the most remarkable of the ancient theatres.* That at Aspendos, in Pamphylia, had an external diameter of 409 ft., and the *skenè* is still perfect. It was built by an architect named Zeno, under the terms of a legacy bequeathed by Curtius, a Roman, and the date is fixed at the reign of M. Aurelius. The largest theatre in Greece was that at Megalopolis, in Arcadia, built about B.C. 371, with a diameter of 480 ft. This is said to have held 44,000 spectators, but it was probably designed for the reception of the entire body of Arcadian citizens, after the victories of Epaminondas had enabled them to form an independent state. That at Syracuse, which is estimated as holding 24,000 people, has inscribed on the divisions of its seats (*cunei*) the names of Hiero II., his wife, his daughter-in-law, and also those of the Olympian Zeus and Herakles.

The form of the theatre was originally suggested by the Cyclic chorus. In early times, the spectators joined in the songs, later on the *choreutæ* were separated from the audience; but the great step was when one of the *choreutæ* mounted on a table (*thymele*) beside the altar, and carried on a dialogue thence with his companions. Probably behind this table was a tent, *skenè*, out of which the actor came; and when this was replaced by a regular stage, the audience naturally formed a semicircle, for whom seats in ascending rows were subsequently erected; while the place of the *choros*, called from their dances *orchestra*, became a segment of a circle. The seats, *thymele*, and stage were originally of wood, but in B.C. 500, on the occasion of a great concourse of spectators at Athens, the seats gave way, and this led to the construction of a theatre in stone. In choosing a site, the main object was a solid foundation, where the audience would be protected from the extreme heat, and where there was free ventilation. As to dimensions, Vitruvius tells us that the *skenè*, which was originally of wood, should be not less than 10 ft., and not more than 12 ft., high. At Epidauros, the *proskenion* is 12 ft. high, ornamented with twelve half-columns and two quarter-columns in the angles of the projecting parts, and four three-quarter columns,—all Ionic. A flight of steps led up from the *orchestra* to the stage, which was backed by a high wall, richly decorated with statues and columns. According to Vitruvius, this wall was divided into three stories, each decorated with columns and a cornice, and regulated as to height by the diameter of the *orchestra*; the top of the wall being on a level with the highest range of seats. In it were five doors leading into a building of narrow width, which had stories corresponding with the façade; the exterior at this end was more or less decorated, and had an exit into the street. In the Greek theatre, the stage is closed with simple walls, but the Roman stage was flanked with stone wings connected with the building at the back, the front being flush with the front of the stage. The roof of the stage has in no case been preserved.

The seats for spectators are in Greek theatres continued beyond a semicircle, the boundary lines being either parallel to the stage, as in Sicily, or forming together an obtuse angle, as in Asia Minor and some of the islands. They were usually set on a slope to save substructure, and, where it was practicable, hewn out of the rock; the height was from 4 in. to 16 in., the width from 2 ft. to 2 ft. 6 in. They were divided into *cunei*, wedge-shaped blocks which radiated from the *orchestra*, and between each pair of blocks was a flight of steps, half the height of the seats, admitting of the ascent of one person at a time. Concentric with the orchestra ran also gangways, *præcinctiones*, of which the height was limited so as to allow an uninterrupted view to the spectators above. Between the lowest steps and the orchestra was either a low wall or a broad gangway, and between the auditorium and the stage was on each side a passage, *parodos*, separated from the seats by a low wall to prevent any one falling over. These passages were on the same level as the *orchestra*, which was paved, and constructed usually with ducts for carrying off the rain, and cisterns or fountains for supplying drinking-water for the spectators. In case of bad weather, shelter was provided by a smaller building often erected close by, or, in later times, by porticos and gardens behind the *skenè*. *Velaria*, awnings for protection from the sun, were not introduced until Roman times, and were first used in Campania.

The *thymele* seems to have been a platform occupied by the *choros* and musicians, higher than the *orchestra* and lower than the stage; it derived its name from the sacrifice, *θυή*, which was cut up on the table which originally stood beside the altar of Dionysos. The stage, *logeion*, was 10 ft. or 12 ft. above the *orchestra*, as is actually the case at Epidauros. Scenery was for the most part supplied by painting, fixed probably against the architectural background of the *skenè*, and sudden changes of scene were effected by mechanical contrivances called *periakti* and *ekkuklema*. The *periakti* were triangular revolving prisms, one on either side of the stage, on each face of which a different scene could be represented, corresponding with the changes in the action of the play. In the *ekkuklema* the interior of houses was suddenly revealed, as, for example, to show a dead body after a murder. Other arrangements allowed of letting down a god from the *theologeion*, or of calling up apparitions from below by the "ladders of Charon," of which Pollux speaks. As time went on, and scenery and properties became more elaborate, devices were introduced for simulating effects of night, thunder, lightning, &c. The Emperor Claudius is said to have improved the contrivance for making thunder. In the Roman theatre, and probably also in the Greek theatre, the stage was concealed by a curtain till the performance commenced.

In the construction of theatres the laws of acoustics were carefully studied, gradations being arranged according to the canons of mathematical proportion and of music; bronze vessels, grouped as musical symphonies by their different notes, were placed in cells under the seats, so that the voice should reach the ear more clearly and strongly. Vitruvius gives minute directions for their arrangement, which he says is found in Greek and Italian cities, but not at Rome. None of these vessels have been found in modern times, but in buildings in Crete rows of niches have been remarked, probably intended for their reception, and at a church in Constantinople an earthen jar was found in the vault, with the mouth turned outwards, which may have been inserted for acoustic reasons, earthen jars having, as we know, been employed where bronze vessels were not forthcoming.

For the musical contests of the Greeks a special class of theatre, *odeion*, was designed, which was roofed instead of being, like the dramatic theatre, hypæthral: into this the light was admitted by a central aperture, as in the *impluvium* of a Roman house. At Athens there were two such Odeia, the one, of Herodes Atticus, of which the ruins exist close to the Dionysiac Theatre, and which held about 6,000 people; the other, mentioned in literature, south-east of the Olympieion, where the rhapsodists and citharœdists contended before B.C. 500, and which latterly became a public granary and law-court. The oldest *odeion* was that at Sparta, a circular building said to have been erected by Theodoros of Samos, and called "Skias," from the roof of which was suspended the ten-stringed lyre of Timotheus, condemned by the Spartans as an innovation in music. The *odeion* of Perikles at Athens was also circular, with a conical roof, the form of which was said to have been suggested by the royal tent of Xerxes, which was part of the spoils of Salamis. The head of Perikles seems to have been conical, hence the comic poet Kratinos says of him that he went about as if he had the *Odeion* on his head. The masts of the Persian vessels taken at Salamis supplied the timber for the roof. At Knidos is a small *odeion* only 23 ft. 3 in. in diameter; here the *skenè* is replaced by a platform, composed of a single row of large blocks. Before the centre of this stands a pedestal about 6 ft. by 3 ft. by 1 ft. 8 in., to which a step leads up on the west side; and the entire platform from west to east was traversed by a metallic grating or screen, which thus replaced the solid masonry of the *skenè*. The area between the seats and the platform corresponds

* For report of the first lecture see *Builder*, p. 318, *ante*.

with the *orchestra*, but is not paved. At the back of the grating three steps lead to the platform, up which the performer ascended to the pedestal, on which vase pictures often represent him standing. Close by is a semi-circular alcove, beyond which are steps and platforms arranged concentrically with it; this was probably the building in which the judges in the musical contests held their meetings, and awarded the prizes.

## THE ARCHITECTURAL ASSOCIATION.

RECENT SATURDAY AFTERNOON VISITS.

*Messrs. Farmer & Brindley's Marble and Stone Works.*—On a recent Saturday afternoon a large party of the members of the Architectural Association visited the well-known marble and stone works of Messrs. Farmer & Brindley, in the Westminster Bridge-road. In the absence of Mr. Brindley, who was in Spain, the visitors were very kindly received by Mr. Barnes, and by him conducted over the workshops. A great deal of work in progress in the shops was for buildings for which Messrs. Bodley & Garner are concerned as architects. These works included the new credence table for St. Paul's Cathedral, in white marble; five large figures, St. George, St. Andrew, St. Patrick, St. David, and King David, for Marlborough College Chapel; memorial panels for the Chapel of the same College; and a fine double-effigied monument to the late Lord and Lady Halifax, for Hickleton Church, near Doncaster. The pedestal for Mr. Thornycroft's Gordon statue, for Trafalgar-square, was also seen in progress; it is of Hopton Wood stone, while the statue will be of bronze. A very fine font, the bowl of grey Mexican onyx, for the Harrow Mission Church, Latimer-road (Mr. R. Norman Shaw, R.A., architect) was also on view. The members had an opportunity of seeing a great deal of very ingenious marble-cutting and polishing machinery at work, including the remarkable pneumatic tool, worked by compressed air at a pressure of 50 lb. to the square inch, and making no fewer than 15,000 strokes per minute. After spending some time in the firm's very interesting museum of specimens of marbles, porphyries, and granites, the members, through Mr. F. R. Farrow, one of the Hon. Secretaries of the Association, thanked Mr. Barnes for his courtesy.

*Beaumont College, Egham.*—This building was visited by the Association last Saturday afternoon. The object of the excursion was to visit the new Junior School, situated on Priesthill, Beaumont, Old Windsor, in the parish of Egham. Beaumont College was purchased about thirty years ago, and accommodates 200 students. The new building, the Junior School, is a quarter of a mile distant, and was commenced two years ago, and is to accommodate sixty students. Mr. J. F. Bentley is the architect. The building faces the north, with a frontage of about 210 ft., in the centre of which is the entrance-hall, which has two very deep bay windows, one on either side of the entrance, surmounted by lofty turrets, and with a deeply-recessed porch between. On either side of the entrance-hall there are visitors' rooms, and the school and dining rooms forming the front block, flanked on the east side by the chapel, and on the west side by the matrons' room, kitchen, and offices, with the infirmary over. A large quadrangle at the rear is surrounded by schools; there is a large study on the east side, and play-room and refectory on the west side, from which it is divided by cloisters. In the upper rooms are the dormitories, &c. The contract has been undertaken by Messrs. Stimpson & Co., of London, for 18,500*l*. The entrance-hall is paved with mosaic work by Messrs. De Grelle & Co. The whole of the schools, corridors, dormitories, &c., are paved with wood-block flooring by M. C. Duffy & Son, by their "Immovable Acme" system of solid wood-block flooring; the chapel is paved with oak and walnut wood-block flooring by the same firm. The stained-glass work has been executed by Messrs. Savell & Young, from designs made by the architect. The whole of the building is to be lighted by electricity by Messrs. Lang, Wharton, & Down. Externally the new college is faced with red bricks from Slough, and Bath stone dressings from Messrs. Yockney & Co.'s deep bed, Corsham. The roof is covered with tiles by Messrs. Cooper, of Maidenhead. The metal casements and gearing are supplied by Messrs. Elsley & Co. The school fittings are by Bennett's Furnishing Company. The lead and copper finials are by Messrs. Richardson & Ellson. The clock is by Messrs. Gillett & Co., of Croydon. The baths, water-closets, and sanitary appliances are by Messrs. Doulton.

## CROSSNESS OUTFALL SEWAGE WORKS.

AT the meeting of the Metropolitan Board of Works on the 4th inst., the Chairman (Lord Magheramorne) opened and read tenders received in answer to public advertisement for works to be done at the Southern Outfall Sewage Works, Crossness, comprising alterations to the existing sewage-reservoirs, the construction of precipitation channels, sludge-settling channels, liming and iron-water stations, settling-ponds, engine and boiler-houses, coal-vaults, chimney-shaft, workmen's cottages, jetty and pier, tramways and other works, from plans by the Board's Engineer, Sir. J. W. Bazalgette. The tenders were as follow:—

| | |
|---|---|
| Perry & Co. | £295,184 |
| S. Pearson & Son | 294,000 |
| B. Cooke & Co. | 293,000 |
| McCrae & McFarland | 281,500 |
| J. Mowlem & Co. | 279,825 |
| Kirk & Randall | 271,840 |
| Williams, Son, & Wallington | 270,873 |
| Thos. Docwra & Son | 270,789 |
| William Webster | 259,816 |

The *Metropolitan* reports that, on the motion of the Deputy Chairman (Mr. George Edwards), the Board accepted the lowest tender, being that of Mr. William Webster, the representative of the firm in attendance explaining that the business was carried on by the late Mr. William Webster's son with the same staff and managers.

We sincerely trust that events may prove that the large expenditure now resolved upon, as well as that for the large contract now in hand at the Northern Outfall works at Barking, will not be thrown away, although we have grave doubts on the subject,—doubts which are shared by many engineers, as we have said on previous occasions.

## IMPROVEMENTS IN VIENNA.

WITH a view of adding to the attractions of Vienna, a project has been matured for the development of the Kaiser Garten at the entrance to the Prater. These beautiful gardens are the private property of the Emperor and his two brothers, and the public have hitherto been entirely excluded from them. The matter has been taken up by an English syndicate, and arrangements have been made for building on the gardens a first-class club, with lawn tennis for the summer and skating in the winter. A theatre, specially adapted for use in both summer and winter, and a riding school of sufficient size for masquerade balls and exhibition purposes; also a restaurant, surrounded by terraces. The gardens, which are about 11 acres in extent, will be laid out with cascades, fountains, and flower-beds, and with conservatories for the purpose of winter promenade. The undertaking has already, we are informed, the support of the two leading clubs of Vienna, and of some of the most prominent persons in Viennese society. Mr. Frank Kirk (of the firm of Kirk & Randall), representing the syndicate, together with Mr. Walter Emden, (who was the architect of Terry's Theatre), and M. A. Chambon, the architects, had recently the honour of an audience with the Emperor, at which the plans were submitted and the project fully explained to his Majesty, who expressed his approval of the scheme and promised to give it his best support.

In laying out the gardens, the principal trees will be carefully preserved, and the railway at the end will be concealed by rockwork, forming a cascade and fountain, with a sheet of water in front large enough for skating in winter.

The club, with its lawn-tennis grounds, shaded by large trees, will be placed near this cascade, and the balcony of the club will overlook this part of the gardens.

The auditorium of the theatre will be entirely fireproof; the stage will be cut off by a fireproof curtain. Hydrants will be fixed on each circle. The stage will be hydraulic, so that little woodwork will be used, and it will be dominated by water supply, which can be turned on at a moment's notice. The system of protection from fire will be that adopted in the last-built London theatres. The roof will be made to open in the summer. The theatre will be entered in front from a grand entrance-hall, and from each side there will be exits to each circle; also private entrances for the emperor and the archdukes. The balcony over the arcade will communicate with the upper circles, so that the public can use it for promenading, or, in case of fire, for escape. There will be four tiers, each having a separate staircase. The ventilation will be by a system of exhausts, under entire control. The whole interior decoration of the theatre will be in the Indian style, the foyers and refreshment-rooms being treated as Indian temples.

The restaurant will be raised on a terrace above the Haupt Allee, so as to overlook it. It will have on the ground-floor two large *salons*, one on each side of the entrance and grand staircase. The *salons* will be decorated in the French Renaissance style. Each *salon* will have its own service and retiring rooms. There will be a private staircase to the first floor, which will consist of a series of private dining-rooms, each decorated in a different style. There will be examples of Moorish, Turkish, Japanese, Flemish, Italian Renaissance, &c., the whole of these rooms being furnished in accordance with the decorations.

The riding-school will be sufficiently large to admit of lawn-tennis being played in it. It will be oval in form, surrounded by a gallery for spectators, and a tribune at each end.

The general contractors are Messrs. Kirk & Randall, and the decorations will be carried out by Messrs. Heighway & Son, from designs by Messrs. Walter Emden & Alban Chambon, the architects for the whole scheme.

## MR. EDWIN CHADWICK, C.B., ON ERRORS OF LOCAL ADMINISTRATION.

ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

On Saturday the closing meeting of the session of this Association (with the exception of one to be held at Liverpool during a visit to an affiliated association in the North-Western district), was held at the Westminster Town-hall, when the President, Mr. Edwin Chadwick, C.B., delivered, as usual, a presidential address. The venerable sanitary reformer adopted for his text "The Errors of Local Administration." He commenced by observing that in the new Local Government Bill there was no direct provision for paid sanitary officers of the status of the members of that Association, and he believed it had become necessary for them to appeal to their friends in the House of Commons to support, in the interests of the public, the efforts of those who were so earnestly trying to elevate themselves and their profession. One sanitary operation alone, the securing of subsoil drainage on the separate system, had reduced by one-half the number of deaths in this country from consumption, and had advanced the mean age of death from that disease from thirty years to fifty years. Taking the estimate of Sir James Paget, that 24,000,000*l*. per annum was the insurance rate paid to benefit societies by the wage-earning classes, as a provision against sickness, he calculated that better sanitation could reduce this cost by one-half, and the whole work could be done for one-third of the sum saved on the insurance expenditure of the working classes alone. In opposition to those who contended for the parish as a basis of local administration, Mr. Chadwick pointed to a parish in Middlesex (Perivale, near Ealing), which contained only four houses and thirty-four people, while others, like St. Pancras and Islington, contained 236,000 and 282,000 souls. To prescribe the parish as a unit of administration would be like prescribing to an architect to construct a building of little pebbles and great boulder stones exclusively. The smaller the parish the greater the waste. The cost of poor-law administration, which was 6s. 7d. per head in the largest parishes, rose to 15s. per head in those of small size, and to 1*l*. 11s. 11½d. per head in the 100 smallest parishes in the kingdom. The most notable benefits had followed the adoption of the policy of forming parishes into unions of twenty or more parishes, and the appointment of qualified paid officers to do the work formerly supposed to be done by unpaid officials. The dis-turnpiking also of roads was an illustration of the advantage of extending the basis of administration over large areas of united parishes. The more scientific treatment of the roads now prevailing in Ireland would reduce the charge for maintenance by nearly a

third, if applied to England, would save one horse out of every five, and about 8,000,000*l.* in the cost of transit. It might be stated as a general rule of local administrative organisation that the larger the administrative area, the greater the means of economy,—by the provision of competent and responsible paid officers and operatives; that the larger the area, the greater the means of obtaining good supplies for institutions by open tender; the greater the means of employment by combined establishments, the better the means of superintendence of productive labour.

A vast amount of ignorance prevailed still among our politicians of high position, and even Cabinet Ministers, and matters were in a still more deplorable condition abroad than at home. While London had a death-rate of 19 per 1,000, Paris, with its superior climate, had one of 26 per 1,000, Berlin one of 27, and Vienna one of 29. Germany, in the care it took of the health of its soldiers, was in advance of all other Continental States. While the death-rate in the British Army at home continued to be 8 per 1,000, Germany had reduced its army rate to 6 per 1,000, while that of France rose to 10, Italy and Austria to 11, and Russia to 16. In Germany, it might, in fact, be said that the army cost the country nothing, so great was the gain in industrial money value of the lives of young men through the habits of discipline and regularity acquired while serving. In the words of Hobbes, speaking of the natural state of man in his time, the populations of our slums still lived a life which was "poor, nasty, brutish, and short," and it was the object of this Association to replace, as far as possible, "poverty by competency, nastiness by comfort, brutishness by education, shortness of life by length of days, and that health which brings, naturally, not only a long life for each member of the human family, but happiness in which to enjoy it. None amongst men had a nobler task than theirs."

After the delivery of the address, Dr. B. W. Richardson, the Chairman, Mr. Alexander, Mr. S. C. Legg (Secretary), Mr. Horn, and other members addressed the meeting, and the following resolutions were subsequently adopted:—

1. "That the attention of the President of the Local Government Board be directed to the fact that by Section 118 of the Local Government Bill it is proposed to appoint a large majority of the urban and rural sanitary inspectors annually, biennially, or triennially, instead of permanently."

2. "That such officers at the end of their present term, during which they are under the protection of the Local Government Board, will be face to face with new authorities knowing little of the work of sanitation, with no certainty as to their salaries, and will be entirely subject to local, and, it may be, adverse influences."

3. "That the interests of public health and those of the health officers are one and indivisible, and that such interests can only be secured by Government control."

4. "That Section 118 should therefore be amended with a view to secure permanency of tenure of office under the Local Government Board, and that the protection should be afforded to all officers who have held their offices for two years."

## ARCHITECTURAL SOCIETIES.

*Edinburgh Architectural Association.*—A meeting of this Association was held on the 3rd inst., the President (Mr. Hippolyte J. Blanc) in the chair. Mr. Gilbert Goudie read a paper on the "Brochs, or Round Towers, of Celtic Scotland." Proceeding to describe those structures, Mr. Goudie submitted, as a typical example, the broch in the island of Mousa, Shetland. As regarded the contents of the brochs, there had been found numerous articles indicative of an Iron Age occupancy. Mr. Goudie had no hesitation in asserting the theory which assigned those brochs to native builders, old Celts of Scotland and the isles, in the pre-Scandinavian period, terminating more than a thousand years ago. They appeared to have been simply towers of defence. At the close, a hearty vote of thanks was accorded to the lecturer. The Chairman afterwards alluded to the designs by the first section of the work-class, shown on the walls, and said the Association hoped to so systematise the classes next year that young men would have an opportunity of going forward for the examination of the Royal Institute of British Architects. The prize-winners were Mr. John Begg, Mr. Robert Lorimer, and Mr. Victor Horsburgh. A vote of thanks was awarded to Mr. David M'Gibbon, who conducted the class.

*Glasgow Architectural Association.*—The tenth annual report of this Association, just issued, is of a most satisfactory character. The roll at the end of April shows an increase of thirty-three on last report, thirty-nine new members having joined and five left, the total being 112. Of those, 10 are honorary members, all architects; 102 ordinary, of these 17, having residence and place of occupation outside of Glasgow, rank as corresponding members. The composition of the class of ordinary members is as follows:—Architects in practice, 12; draughtsmen, 46; pupils, 35; and decorators, &c., 9. A large number of papers have been read and discussed, courses of lectures on special subjects have been delivered, and numerous visits to old buildings and to works in progress have been made. The long-considered project of publishing a complete measurement of Glasgow Cathedral has now been fairly started, and already considerable progress has been made. The nature of the undertaking is of such dimensions that one session's effort, and especially the first, overtakes but a small portion of the work. Unfortunately preliminary arrangements had not been completed till June, when a start was made; since then, however, a good portion of the nave, choir, and lady chapel, has been measured. As yet the work as it proceeds has been merely plotted in a rough way, to be re-drawn later for publications. In January a class for the study of stereotomy was begun under Mr. Kirkwood, mason. The library has been well used by the members.

## CASE UNDER THE METROPOLITAN BUILDING ACT.

### CHIMNEY SHAFTS.

AT the Dalston Police-court on the 3rd inst., a summons under the Metropolitan Building Act, taken out by the District Surveyor for East Hackney (North) against Brooke, Simpson, & Spiller, Limited, was heard.

The defendants were summoned for having raised and partially rebuilt a chimney-shaft at their manufactory, Atlas Work, Hackney Wick, without having given notice to the District Surveyor.

The contentions of the defendants were that the chimney-shaft was not a building, as it had no roof, and that the work was a necessary repair not affecting the construction of any external or party-wall, as the shaft was detached from the external wall of the building, with which it was connected by a flue at the base.

The defendants were fined 3*l.*, and 2*l.* 2s. costs.

## THE ARCHITECTURAL ASSOCIATION'S WHITSUNTIDE EXCURSION TO IRELAND.

SIR,—As I had no hand in the announcement [see *Builder*, p. 310, *ante*] of my name as generally conducting this excursion, and am but indifferently qualified to undertake some of it, allow me to inform intending excursionists that the Kilkenny visit will be in charge of the best possible authority on the antiquities of that place, Mr. R. Langrishe, architect, a Kilkenny man born and bred, and as sound an antiquary as he is a genial companion for a day out, who will take the matter in hand. I have much to learn about Kilkenny from him.

THOMAS DREW, R.H.A.

6, *St. Stephen's Green, Dublin.*

## "THE VENTILATION OF SEWERS."

SIR,—Mr. Santo Crimp is a clever sewer engineer. For this reason, I not only held him in great respect, but thought he would, when he had had longer experience, discover and introduce valuable sanitary improvements. But clever people sometimes make bold, impetuous, and wrong assertions; and sometimes, by doing so, they show the *expert* where and how they have come to wrong conclusions. I am sorry to see that these are prominent in Mr. Santo Crimp's letter, at p. 324, *ante*. If I were to investigate the matters he has referred to at Wimbledon, I should soon find where and how he has blundered. When he was very young I investigated hundreds of similar cases in the Westminster sewers, and often found the causes which produced the effects most difficult to discover. It would appear, however, that Mr. Santo Crimp came intuitively to his conclusions without investigating the causes. If he did investigate and find them, what were they? As to his statement that he applied a "water-trap" in a sewer eight years ago, and more recently "isolated several miles of sewers" in the same manner, and "so far anticipated my plan," I may inform him that that plan had often been carried out by others, as well as by myself, before he was born. The result of my nearly fifty years' practical experience as a sewerage engineer is the "suggestion" as to ventilating sewers in my article at p. 296, *ante*, which Mr. Santo Crimp will not be able to "write down." A *résumé* of that article may be given in the following form:—

What Mr. Santo Crimp, or any engineer, has to do in order to *effectually* ventilate the sewers under his care is as follows:—First, put syphon traps on all the gully-drains near their receiving ends, and on all the house-drains near their discharging ends, so as to effectually prevent the air-currents in the sewers from passing up the former into the streets, and up the latter into the houses; secondly, put manhole shafts, with gratings and movable covers thereon level with the streets, at all the junctions of the sewers, and at intermediate places where the junctions are very wide apart; thirdly, put specially-constructed syphon-traps, with accessible movable air-tight covers on their outlet divisions, in the bottom of the manhole shafts, so as to divide the sewers, for the purpose of ventilating them, into separate sections, and to prevent the air-currents in the separate sections from passing out of their upper ends into the manhole shafts, and thence up the adjoining sections; and fourthly, put ventilating pipes, with air-tight joints, from near the upper ends of the separate sections to the housetops.

Now, if Mr. Santo Crimp, or any engineer, will properly carry out what I have described, he will find that currents of fresh air will be always flowing from the streets down the manhole shafts into and up the lower ends of the separate sewer sections there; and that the ventilating pipes, going from the upper ends of the separate sewer sections to the housetops, will be always discharging into the atmosphere there, the ventilation being produced by the temperature of the internal air being slightly in excess of that of the external air.

Mr. Santo Crimp says, in the last paragraph of his letter, "that my conclusions as to the *effect of the temperature* are entirely erroneous, so far as the Wimbledon sewers are concerned." One might infer from this that no hot or tepid waste-water is ever discharged from the houses into the sewers in Wimbledon, and that therefore the temperature of the air therein is never raised from that source. It would also seem that he does not believe what all scientists teach, namely, that heat is the cause of the expansion, lightness, elasticity, and movement of air, vapour, and gases, and consequently of all spontaneous ventilation.

JOHN PHILLIPS.

*Putney, S.W.*, May 5, 1888.

## BLACKBURN TECHNICAL SCHOOL COMPETITION.

SIR,—I feel sure that every one who has taken any interest in this competition will agree that a praiseworthy effort has been made by the committee and the assessor to conduct it with the utmost fairness, and also that, on the whole, that effort has met with success. But I ask you to insert this in order to obtain from the assessor himself an explanation of the principle on which he awarded the second and third premiums; or, failing this, to ascertain clearly what architects consider the right principle on which, in future competitions, the designs should be premiated.

The usual principle, it will be allowed, is to place that design second which, in the absence, for any reason whatever, of the first design, would be recommended by the assessor for adoption, and so on with the third premium. Now, I ask, is this the principle which guided Mr. Robins in his award?

I must say that after reading his report and inspecting the designs, the premiated one especially, but also the others submitted, it seems to me that a negative answer is the only one possible. The only principle which to me would explain the selection is this,—that the first prize is given to the best of the L-shaped plans, of which there are thirty-one (see Report); the second prize to the only specimen of the L reversed; and the third to the best of the V-shaped.

If this be so, it is surely a dangerous system, in view of the possible disqualification of the first

premiated design, and a very arbitrary and fanciful principle of award. It is clear, I think, that if the L-shape,—that suggested in the instructions by Mr. Robins,—is right, the L reversed must be wrong, and surely one of the remaining thirty of the L shape is likely to be more nearly right than it, or even than a plan of the V shape.

QUARE.

## CONTINUOUS GIRDERS.

SIR,—I have followed with much interest your able articles in the "Student's Column" on various subjects. Referring you to the articles appearing in your issues of April 14th and 21st [pp. 269, 290], on "Continuous Girders, however, I will, with your permission, make a few observations which may further help to elucidate the interesting problem of deflection as affecting the strength.

It appears to me that the writer has represented this question of deflection in too damaging a light. This arises from the very unusual build of girder he employs (or rather *retains*) to span two openings of 30 ft., and the consequent excessive and injurious stiffness of the girder under the conditions to which it is subjected. It is not necessary, and it is certainly far from advisable, to retain the same build and section of girder to span these openings as is required for one single span of 60 ft. On the contrary, if we adapt our girder to the advantages arising from the continuity over the central pier, we will find that a much greater range of deflection may be allowed without seriously influencing the strength. A decided advantage is secured by a depression of the central pier about 1-100th the depth of girder, if the ratio of span to depth be as 10 or 12 to 1.

To illustrate.—Let the data of load, span, and stress per square inch be as previously stated; then by assuming

Depth of girder = 3 ft.

$$\text{Area of flange} = \frac{112{\cdot}5}{5\times 3} = 7{\cdot}5 \text{ square inches.}$$

$$I \text{ (approximately)} = 2(7{\cdot}5\times 1{\cdot}5\times 1{\cdot}5) = 33{\cdot}75.$$

E = 10,000 tons.

Consequently by substitution

$$d = \frac{5l^4}{384EI} = \frac{5\times 12{,}960{,}000}{384\times 10{,}000\times 33{\cdot}75} = {\cdot}5 \text{ ft.}$$

$$d_1 = \frac{Cl^3}{48EI} = \frac{C\times 216{,}000}{48\times 10{,}000\times 33{\cdot}75} = \frac{C}{75}$$

With these values the reader may work out for himself the values of C and A under the assumed deflections of $\frac{1}{4}$ in., $\frac{1}{2}$ in., $\frac{1}{8}$ in. by the method you adopt, and compare the results.

This operation being somewhat tedious, however, we can more easily arrive at the same results by aid of the following formula :—

Since the positive moment due to a central load on A B, fig. 1, equals $\frac{WL}{4}$, and the deflection $\delta$ for same load equals $\frac{WL^3}{48EI}$ we may write

$$+M = \frac{12EI\delta}{L^2} \quad \text{.....Eqtn. (I.).}$$

Hence the negative moment over the pier (when subject to a deflection) is

$$-M_c = -112{\cdot}5 + \frac{12EI\delta}{L^2} \quad \text{.....Eqtn. (II.).}$$

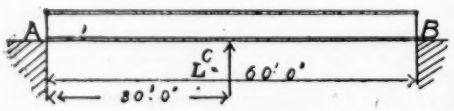



*Fig.* 1.

From equation I. it will be seen that the positive moment varies simply as the deflection; hence having obtained the value of +M for $\frac{1}{8}$ in., we can write $\frac{+M}{2}$ for $\frac{1}{4}$ in. deflection and $\frac{+M}{4}$ for $\frac{1}{8}$ in. deflection thus :—

*Case* 1.—

$$\text{Let } d = \tfrac{1}{8}\text{ in.} \therefore M_c = -112{\cdot}5 + \frac{12\times 10{,}000\times 33{\cdot}75\times \frac{1}{8}\text{ in.}}{60\times 60\times 12\text{ in.}} = -112{\cdot}5 + 47 = -65{\cdot}5 \text{ ft. tons.}$$

*Case* 2.—

$$\text{Let } d = \tfrac{1}{4}\text{ in.} \therefore M_c = -112{\cdot}5 + \frac{47}{2} = -89{\cdot}0 \quad ,,$$

*Case* 3.—

$$\text{Let } d = \tfrac{1}{8}\text{ in.} \therefore M_c = -112{\cdot}5 + \frac{47}{4} = -100{\cdot}75 \quad ,,$$

Observations.—From Case 1, in which we have allowed a deflection of $\frac{1}{8}$ in., we find that the reaction at A equals,—

$$A = 15 - \frac{65{\cdot}5}{30} = 12{\cdot}8 \text{ tons.}$$

Hence the maximum positive moment in the girder equals

$$(12{\cdot}8\times 12{\cdot}8) - 12{\cdot}8\times 6{\cdot}4) = +81{\cdot}92 \text{ foot tons.}$$

We conclude, therefore, that when the central pier has been lowered $\frac{1}{8}$ in. the girder, when of uniform section, is relatively stronger to resist the load upon it than when there was no deflection, in the ratio of 112·5 to 92 nearly.

From the value of +M we find that a deflection of 1·2 in. may take place without detriment, for then the negative moment is *nil*, and the maximum positive moment = +112·5 foot tons, and the girder then acts as two independent beams under positive moments throughout.

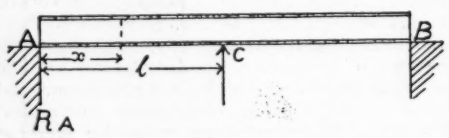



*Fig.* 2.

To find the position of the point of contra flexure giving the maximum negative moment equal to the maximum positive, which is the most advantageous adjustment possible, we have from the equation to the moment at any point $x$ (see fig. 2),—

$$M_x = R_A x - \frac{wx^2}{2} \quad \text{.....Eqtn. III.}$$

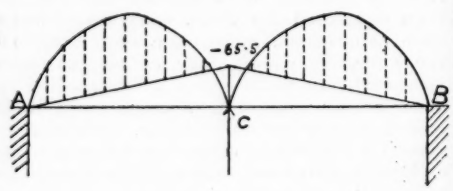
$$\text{and} - M_c = R_A l - \frac{wl^2}{2} \quad \text{.....Eqtn. IV.}$$

Equating Eqtn. III. = Eqtn. IV. with sign changed and substituting $R_A = wx$ and solving the resulting quadratic we obtain $x = (\sqrt{2}-1)l$.

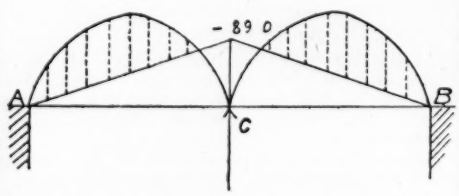
Hence point of contra flexure = $2(\sqrt{2}-1)30$ ft. = 24·8526 ft.

The deflection corresponding to this adjustment is $d = {\cdot}3755$ in., or $\frac{\text{depth of girder}}{100}$ very nearly, and maximum moments = ∓77·2 foot tons.

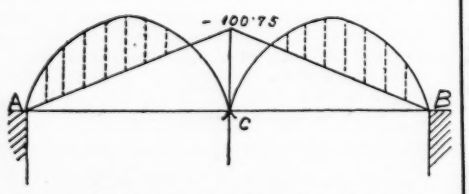
Case 1




Case 2




Case 3




Conversely, if the centre bearing is higher than the horizontal line joining the abutments by an amount equal to 1-30th depth of girder, the girder can only carry one-half the load it safely bears when the supports are level; or one-third of the load it is capable of sustaining when the deflection of the central pier is equal to 1-100th the depth of girder.

WILLIAM ROBERTSON, C.E.

*Maybank, Perth.*

*** The object of our articles has not been to advise upon design, so much as to elucidate the general theory, and, as stated in the title of each article, to draw a comparison.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

**5,510, Machinery for making Pegs for Joinery. H. and E. Rielle.**

Wooden pegs for scarfing or for other uses in joinery, carpentry, cabinet work, &c., are generally made by a costly process of hand-labour. It is difficult even with this labour to obtain uniform evenness. Another difficulty in hand-labour is the care necessary in making the pegs, for workpeople generally, considering the time spent on the manufacture of the peg as lost, perform this necessary part of their work negligently. In the small machine which is the subject of this invention, and by which 500 pegs can be turned out in one hour, the pegs are made of a rectangular tapering shape, all evenly and uniformly cut. Lateral knives are used and two cuts are made, the edges of the pegs being planed by the action of the second movement. The machine is made to work either with hand or power; and if a third knife is used the turn-out can be increased to 600 or 800 pegs an hour.

**6,385, Fireplace Heads or Hoods. C. Hunt.**

The novelty in this invention consists in forming the arch or covering of the opening, together with the mouth and gathering of the flue, in one process, by means of a special block of concrete. By the use of the improved form the large cold-air space over the stoves and ranges and at the mouth of flues with the ordinary mode of construction is avoided, and the gathering of flues can be made to any required curve or direction by simply adjusting the blocks in a mould, thus dispensing with the corbelling and cutting of brickwork and masonry.

**7,238, Ventilating Drains, Sewage Pipes, &c. F. F. Abbey.**

A wheel, turned by the flow of the sewage itself, drives a wind-wheel or fan, or suction-pump, so as to circulate air in the drains.

**7,584, Fireplaces. H. Schallehn.**

To arrange for the better consumption of smoke, baffle plates are, by this invention, fitted on a chamber at the back of the top of the stove.

**2,531, Storm Doors. W. R. Lyle (U.S.A.).**

Removable panels are, according to this invention, made so as to fit on ordinary doors, strengthening them, and providing for the insertion of wire screws on either side, which, when placed in position, form an effective protection.

**2,051, Preventing Escape of Smoke into Rooms. A. Gassis.**

The entrance to the chimney is divided into two parts by a plate or glass that is capable of being partly rotated by means of a handle. The draught can, in this way, be regulated according to requirement. Arrangements are made for the admission of air into chambers, where the gases are forced upward with increased velocity, so that the formation of smoke is prevented; or, if it be produced, it is kept from hovering over the grate and escaping into the room or apartment.

### NEW APPLICATIONS FOR PATENTS.

*April* 27.—6,229, T. Twyford, Water-closets.—6,242, W. Dixon and W. Rodgers, Water-closets.—6,247, N. Martin, Window-sash or Casement Fasteners.—6,261, J. Sellars, Cement.

*April* 28.—6,304, J. Townsley and B. Rushforth, Ventilating the upper Parts of Houses, &c.—6,324, E. Newton, Roofs of Greenhouses, &c.—6,338, J. Smith, Bricks, Tiles, &c.

*April* 30.—6,364, J. Porter and T. Langton, Chimney Pots.—6,369, J. Davies, Flushing Apparatus, &c., for Water-closets.

*May* 1.—6,422, J. Freebury, Decorations and Inscriptions in Stone and Marble.—6,472, A. Boult, Door-knobs.—6,499, W. Kinnear, Metallic Ceilings.

*May* 2.—6,526, C. Richards, Door-lock.—6,528, C. Doran, Window-sash Fastener.—6,548, T. Hellwell, Glazing Roofs, &c.—6,554, T. Palmer, Materials for Covering Walls, &c.

*May* 3.—6,588, T. Bennett, Domestic Firegrates.—6,607, W. Mather and J. Booth, Sash Fasteners.—6,629, J. Elliott, Roofing Slabs, Tiles, &c.—6,635, T. Aldridge, Burglar-proof Self-locking Window or Door Fastener.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

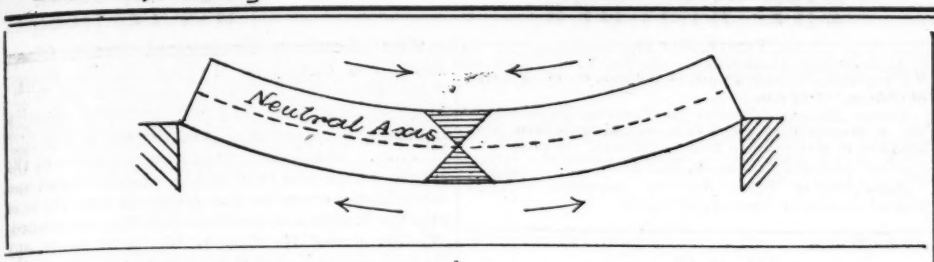
373, G. Pratt, Water Waste-preventer.—2,012, A. Clifford, Testing Drain-pipes, &c.—2,955, A. Ford and E. Wright, Self-ventilating Sewer Pipe and System of Sewer Ventilation.—2,967 and 3,524, H. Goodridge and S. Fairland, Window Fastenings.—4,012, T. Dykes, Sash Fasteners.—4,148, A. Sautter, Cistern.—4,550, R. Haddan, Construction of Theatres.—4,660, E. Shorland, Air-warming Arrangements for Fireplaces and Stoves.—4,663, W. Whittle, Chimney Cowls.—4,888, F. Turrettini, Endless Saws for Cutting Stone.—4,908, W. & W. Cowan, Flushing Cisterns.—5,259, J. Capek, Electrically Heating Rooms, Buildings, &c.—5,363, S. Hazeland, Woodworkers' Plane Irons.—5,399, R. Stone, Paint.—5,540, G. Neilson, Securing Sliding Window-sashes.—5,697, A. Morrison and M. Ingram, Bath and Lavatory Fittings.—5,728, O. Elphick, Water Waste-preventers.—5,780, F. Ryan, Sink and Gully Stench Traps.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to Opposition for Two Months.*

6,152, W. Thompson, Portable Buildings.—8,893, E. Owens, Device for Operating Fanlights, Skylights, Ventilators, &c.—9,084, J. Warburton, Obviating and Preventing the Escape of Noxious Gases from Sewers, Drains, Water-closets, &c.—10,244, J. Rigby, Cement.—1,446, L. Vojacek, Centrifugal Pumps and Ventilators.—4,632, H. Cawkwell, Tiles.—4,711, H. Lake, Lavatory Basins.—4,747, V. Lemaire, Hinges.

**Architectural Association Water-colour Class.**—We are asked to mention that as a sufficient number of members have not stated their intention of joining this class, the first meeting will be postponed until Thursday, May 24th. The Hon. Secretary (Mr. H. Woollacott, 10, Tavistock-square) will be glad to receive at once names of members wishing to join, and to afford any information concerning the class.




## The Student's Column.

### IRON.

XIX.—SOLID BEAMS.

SOLID beams, and beams with thick webs, should not be calculated in the same way as built-up girders. In beams of a solid section the material is not as well arranged theoretically as in a built up girder, the latter having a comparatively thin web, hence the material approaching the neutral axis can no longer be assumed simply to transmit vertical or shearing stresses, but must to some extent (depending upon the form and dimensions of the cross-section) assist to resist the horizontal stresses, or what in built-up beams or girders we have termed the flange stresses. Girders or beams with thick webs must also be classed for the same reasons with solid beams, and treated in a similar manner when calculating their strengths.

Any material is to some extent elastic, and when subject to stress, however small, it will (according to the nature of the stress) become extended or compressed. In the investigation of the strength of beams, it is assumed that the extension or compression of the fibres is in direct proportion to the stress applied. This is only true as far as the elastic limit of the material will allow, and this elastic limit is reached when the fibres lose their power of returning to their original position and cause a permanent alteration in length, termed the permanent set. As the stresses in the top and bottom layers of a beam are of opposite kinds, it will be seen that there must be a plane somewhere within the section which is unaffected, and where the horizontal stress changes from tension to compression. This plane in a horizontal beam takes a horizontal direction, and its direction is termed the neutral axis, which is evidently free from horizontal stress, as shown in the diagram above.

In the figure the stresses situated in a vertical plane of the section are represented graphically to an exaggerated extent for sake of clearness. The comparative amounts of these stresses are indicated by the horizontal ordinates of the triangle.

Let us suppose we have a solid rectangular beam supported at both ends. When the beam is loaded the top fibres become compressed and the bottom fibres extended, the amount of extension varying according to the distance of the fibres from the neutral axis.

The outside fibres being furthest removed from the neutral axis, are subject to the greatest change of length, and will consequently be subject to a greater stress than any of the fibres situated nearer the neutral axis. As soon as the stress in the outside fibres reaches the breaking strength of the material, the fibres give way and lead to the consequent failure of the beam. From the foregoing arguments we may conclude that the horizontal stresses vary from a maximum in the outside fibres to a minimum at the neutral axis, and that the intensity of the stress may be illustrated by the ordinates of the triangle shown in the diagram. Hence the stress is proportional to the distance of the fibres from the neutral axis, and it is upon this fact that all the mathematical expressions for moments of resistance are mainly based.

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**The Anglo-Danish Exhibition and Fete**, in aid of the rebuilding of the British Home for Incurables, will be held at South Kensington during the summer months, and will be opened on Monday next, May 14th, by H.R.H. The Princess of Wales. The *locale* of the Exhibition is the Royal Albert Hall and gardens in the rear. Messrs. North & Son, of Southwark, have erected a good number of the iron buildings, using their patent interchangeable dowel pins, which conduce greatly to strength, economy, and facility of erection and removal.

## Books.

*Memorials of Herne, Kent.* By the Rev. J. R. BUCHANAN, Vicar. Second edition. London: Elliot Stock. 1887.

THE author of this bright little treatise promises that if it meets with success it shall be followed by another, "giving translations of deeds and documents of great antiquity and interest," and an account of some "Herne's worthies." The present book has reached its second edition. We hope the Vicar will consider this sufficient to keep him to his promise, for he writes in a scholarly and pleasant vein, with a genuine love for his church and all its traditions, and, moreover, with the excellent object of obtaining assistance in the completion of its repair and preservation.

The Vicar, with needless diffidence, disclaims any special qualifications for the task he has taken in hand, and gives credit to many specialists who have seconded him in his labour; but, however that may be, the result is in every way excellent.

Our acquaintance with this in many respects remarkable church is of old date, and sketches made long years ago revive the old memories, and confirm the Vicar's descriptive notes. The church at Herne,—which replaces a much older one,—is affiliated to that at the Reculvers, which is of still higher antiquity and interest. Its wanton destruction in 1809 is recorded by the Vicar in the touching words of the Parish Clerk of the period:—

"Mr. C. C. nailor (the then Vicar) wrote to the Bishop to know if he might have the church took down, and is answer was, it must be dun by a majority of the people in the parish,—so, hafter a long time, he got the majority of one.

For it:—Mr. Nailor, Vicker, Mr. Tom Denne, Mr. W. Staines, Mr. Tom Fix.

Against it:—Mr. William Brown, Mr. Step. Sayers, Mr. Brett, *Clark to the old church forty years.*"

So "down come the church," and there is something quite Thackerayan in the poor heart-sore old "clark's" comment thereon.

"The last tax (text) that Mr. nailor took was these words: 'Let your ways be ways of rightness, and your path the peace,' *and whot wos is thoats about is flock* that day no one knows!"

Both Mr. Nailor and his complaisant Bishop are types now happily extinct, and their successors, so far from "breaking down the carved work with axes and hammers," are doing all they can for the preservation and beautifying of the House of God.

We should like, before leaving the subject, to raise a question about the screen figured on p. 25, which is said to have been the "original rood screen." Canon Scott Robertson says, in his paper on "Kentish Rood Screens," that this one bears "indubitable traces of a rood-loft." The screen, as drawn, is of an unmistakably Renaissance character (the existing church dating only from the fifteenth century), and if really surmounted by a Rood must have been almost the last of such erected in England.

There are many other points connected with the church of extreme interest: the remarkable window tracery, "Perpendicular" in its general character, but having traces of "Decorated" design; the puzzling "Early English" features in the fabric, which Mr. Street thought might have been imitated from older work, but which may have been the actual features of the older church re-used, and many more questions of high architectural and archæological interest, for which, however, we cannot now find room.

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*Records and Record Searching: a Guide to the Genealogist and Topographer.* By WALTER RYE. London: Elliot Stock. 1888.

THIS is a modest title for a most excellent book which will prove of use to many others than those referred to on the title-page; to all, in short, who turn their eyes upon the past for inquiry on any subject. Mr. Rye is widely known as a learned, diligent, and trustworthy antiquary, and in this volume he frankly places at the disposal of the student, as the results of long years of research, the methods by which similar labours may be most easily and successfully pursued. The chapters range from the most elementary instruction in the art of compiling a pedigree to a "Short Antiquarian Directory," giving every periodical and society in Great Britain,—a most useful list.

There are also plans of the Reading and Search rooms at the British Museum and the Public Record Office, regulations, search fees, and the names and addresses of record agents, transcribers, and indexers. A mere antiquary could hardly have avoided making this a "dry" book; but Mr. Rye has succeeded in making it a thoroughly readable one, and has even found room for flashes of pleasant humour in the notes and elsewhere.

Amidst all the multitudinous sources of information to which he has directed the archæologist and pedigree-hunter, he has only omitted one, so far as we have noted, and that is the cast-iron fire backs and dogs which in the fifteenth and sixteenth centuries were so common, which have in great numbers survived in farmhouses and cottages, and which always bear some escutcheon, rebus, monogram, or other connexion with the owners of the manor. They are, moreover, almost always dated.

We are a little surprised to find Mr. Rye saying that "it is like breaking a butterfly upon a wheel to employ skilled labour in making indexes." We suppose that he attaches some special meaning to the word "skilled." Many are of opinion, with ourselves, that the making of a proper index requires considerable skill. Of the value of a good index Mr. Rye is fully sensible; and his own careful index of thirty-three pages to this book of 204 pp. may be taken as a guide and model for the indexer.

We have noted for comment several points of interest, but think it better to say simply that "Records and Record Searching" is indispensable to all those who have any concern with the past.

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## RECENT SALES OF PROPERTY.

### ESTATE EXCHANGE REPORT.

**APRIL 30.**

By G. A. WILKINSON.

| | |
|---|---|
| Tottenham Court-road—No. 125, freehold | £3,580 |
| Upper Holloway—Improved Ground-rents of 57*l.* a year, term 79 years | 1,230 |

**MAY 1.**

By DEBENHAM, TEWSON, & CO.

| | |
|---|---|
| Hampstead Heath—The freehold residence called Myrtle Lodge | 3,400 |
| Southwark—99, Waterloo-road, freehold | 1,560 |
| Barnes-terrace—A plot of land | 135 |

By RUSHWORTH & STEVENS.

| | |
|---|---|
| Bayswater — 40, Porchester-terrace, 41 years, ground-rent 14*l.* 2s. | 3,350 |

By WESTON & SONS.

| | |
|---|---|
| Brixton—3, Holland-grove, 32 years, ground-rent 5*l.* 10s. | 300 |
| 27, Canterbury-road, 73 years, ground-rent 5*l.* 10s. | 500 |
| A plot of freehold land, 7¼ years, ground-rent 3*l.* | 50 |
| Stockwell—6, Mordaunt-street, 76 years, ground-rent 5*l.* 5s. | 220 |

By CHINNOCK, GALSWORTHY, & CO.

| | |
|---|---|
| Holborn—9, 10, 11, 18, and 19, Eagle-street, freehold | 2,480 |
| Euston-square—No. 1, with stabling, 20 years, ground-rent 25*l.* | 650 |
| 2 and 3, Euston-square, 20 years ground-rent 61*l.* 15s. | 1,010 |
| 9 and 11, Euston-square, 20 years, ground-rent 73*l.* 10s. | 905 |
| St. John's Wood—20 and 30, North-bank, 24 years, ground-rent 14*l.* | 290 |
| Marylebone—85 and 86, Crawford-street, 17 years, ground-rent 42*l.* | 660 |
| 89, 90, 91, and 93, Crawford-street, 17 years, ground-rent 84*l.* | 910 |
| Hampshire—Freehold fee farm rent of 20*l.* a year.. | 360 |
| Norfolk—Freehold fee farm rent of 6*l.* 11s. 2d. a year | 100 |
| Westmoreland—Freehold fee farm rent of 10*l.* 14s. 9d. a year | 110 |
| Yorkshire—Freehold fee farm rent of 10*l.* 2s. a year | 180 |
| Cardigan—Freehold fee farm rent of 29*l.* 12s. 8d. a year | 530 |
| Glamorgan—Freehold fee farm rent of 8*l.* a year ... | 140 |
| Pembroke—Freehold fee farm rent of 28*l.* 6s. 9d. a year | 450 |

**MAY 2.**

By R. TIDEY & SON.

| | |
|---|---|
| Kingsland—11 and 13, Stamford-road, 28 years, ground-rent 6*l.* 10s. | 620 |

By T. G. WHARTON.

| | |
|---|---|
| Gipsy-hill, — Gipsy-road — Four villa residences, 90 years, ground-rent 32*l.* | 1,560 |

By EDWIN SMITH & CO

| | |
|---|---|
| Portman-square—15, Bryanston-street, 24½ years, ground-rent 40*l.* | 1,570 |

By F. JOLLY & CO.

| | |
|---|---|
| Millwall—52, 54, and 56, Charles-street, 71 years, ground-rent 8*l.* | 520 |

Stoke Newington—35, Fountayne-road, 88 years, ground-rent 10*l.* ..... £750
Lower Clapton—2, Goulton-road, freehold ..... 830
St. George's-in-East—22, Umberstone-street, freehold ..... 265
Whitechapel—21, Rutland-street, 18 years, ground-rent 2*l.* ..... 170
50, Rutland-street, 19 years, ground-rent 2*l.* 2s.... 145

By H. DONALDSON.

Stoke Newington—74 and 76, Winston-road, 72 years, ground-rent 10*l.* ..... 630

By VAUGHAN & CO.

St. James's—12, Duke-street, 832 years, ground-rent 5*l.* ..... 3,820

MAY 3.

By WARD & CLARKE.

Battersea, Ethelburga-street—A plot of freehold land ..... 335
The residence, Ethelburga House, 38 years, ground-rent 11*l.* ..... 275
Berkeley-square, Charles-street—A Ground-rent of 50*l.*, reversion in 61 years ..... 1,350

By H. J. BROMLEY.

Upper Norwood, Church-road—Newport Villa, 66 years, ground-rent 35*l.* ..... 1,370

By H. C. WOOD.

Bloomsbury, 3 and 4, Devonshire-street—Profit rental of 121*l.* 5s., term 12 years..... 200
Brighton—The reversion to three freehold houses, yielding 225*l.* a year, and a policy for 1,000*l.*, life aged 64 years ..... 2,180

By J. G. & A. PREVOST.

City-road—23, Britannia-street, freehold ..... 320
Homerton—20 and 21, Sydney-road, freehold..... 630
Bromley-by-Bow—4 and 6, Devas-street, freehold.. 285

By NEWBON & HARDING.

Islington—The letting of twenty-two plots of land in Upper-street, term 80 years, yielded 478*l.* per annum .....

MAY 4.

By THURGOOD & MARTIN.

Kentish Town—63, Malden-road, 61 years, ground-rent 8*l.* ..... 570

By BAKER & SONS.

Oxford-street—20, Upper Rathbone-place, freehold 1,385

By ELLIS & SON.

Mincing-lane—No. 43, term 29 years, ground-rent 316*l.* 14s. 8d. ..... 4,020
Fenchurch-street—No. 46, term 13 years, ground-rent 50*l.* ..... 4,970
West Smithfield—Ground-rent of 100*l.*, reversion in 53 years ..... 3,150
Ground-rent of 10*l.*, reversion in 53 years ..... 400

By W. W. JENKINSON.

Sevenoaks—The Woodlands, and 4a. 2r. 11p., freehold ..... 6,000
Lower Clapton—47, Powerscroft-road, 90 years, ground-rent 7*l.* ..... 280

## MEETINGS.

SATURDAY, MAY 12.

*Architectural Association.* — Visit to Essex County Lunatic Asylum, Brentwood. Rail from Liverpool-street 2·3 p.m.

*Society of Arts.*—Conference on "Canals and Inland Navigation." 11 a.m.

*Exhibition of Works in Wood, Carpenters' Hall.*—This Exhibition, under the auspices of the Worshipful Companies of Carpenters and Joiners, will be opened by the Lord Mayor at 2 p.m.

*Civil and Mechanical Engineers' Society.*—Visit to Wolverton and Stony Stratford Steam Tramway.—10·10 a.m. train from Euston.

MONDAY, MAY 14.

*Society of Arts (Cantor Lectures).*—Mr. G. Aitchison, A.R.A., on "Decoration." III. 8 p.m.

*Surveyors' Institution.*—Mr. E. Ryde on "The Rating of Machinery Bill, 1888," now before Parliament. 8 p.m.

TUESDAY, MAY 15.

*Institution of Civil Engineers.* — Further Discussion on Mr. P. Crawford Barlow's paper on "The Tay Viaduct, Dundee," and Mr. W. Inglis's paper on "The Construction of the Tay Viaduct, Dundee." 8 p.m.

*Parkes Museum (Lectures for Sanitary Inspectors).*—Dr. C. Kelly, F.R.C.P., on "Sanitary Law,—General Enactments, Public Health Act, 1875, Model By-laws." 8 p.m.

*Statistical Society.*—Mr. C. Booth on "Condition and Occupations of the People of East London and Hackney, 1887." 7·45 p.m.

*Society of Arts (Foreign and Colonial Section).*—Mr. J. Rankin, M.P., on "Duty of the State towards Emigration." 8 p.m.

*Glasgow Architectural Association.* — Mr. John Dall on "A Sketching Tour in Fifeshire."

WEDNESDAY, MAY 16.

*Society of Arts.*—Mr. R. E. B. Crompton on "Electric Lighting from Central Stations." 8 p.m.

*British Archæological Association.*—(1) Mr. J. Prigg on "Late Celtic Antiquities discovered at Elveden." (2) Mr. J. T. Irvine on "Excavations at Wall." (3) Mr. J. M. Wood on "The Round Towers of Essex." 8 p.m.

*Royal Meteorological Society.* — The "Report of the Wind Force Committee on Experiments with Anemometers conducted at Hersham," drawn up by Mr. G. M. Whipple, B.Sc., and Mr. W. H. Dines, B.A., will be read at 7 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—8·30 p.m.

THURSDAY, MAY 17.

*Society of Antiquaries.*—8·30 p.m.

*Parkes Museum.*—Mr. L. R. S. Tonalin on "Healthy Clothing." 5 p.m.

*Edinburgh Architectural Association.*—Mr. J. Gordon on "Carving." 8 p.m.

FRIDAY, MAY 18.

*Architectural Association.* — (1) Mr. A. H. Hart on "A Travelling Student's Notes in Belgium." (2) Election of Officers. 7·30 p.m.

*Parkes Museum (Lectures for Sanitary Inspectors).*—Mr. A. Wynter Blyth, M.R.C.S., on "Metropolitan Acts, By-Laws of Metropolitan Board of Works." 8 p.m.

SATURDAY, MAY 19.

*Association of Public Sanitary Inspectors.* — Third Annual Provincial Meeting, Liverpool.

## Miscellanea.

**Extensive Sale of Freehold Ground-Rents.**—One of the largest sales of freehold ground-rents which has for some time past been effected took place at the Auction Mart a few days ago, when Messrs. Fox & Bousfield submitted to competition property of this character amounting to 3,176*l.* per annum, arising from well-let warehouses and other premises in the City, near Aldersgate and Fore-street. The property offered comprised fourteen lots, consisting of freehold ground-rents ranging from 124*l.* to 443*l.* per annum. There was a very large attendance of capitalists, one of the largest sale-rooms at the Mart being inconveniently crowded. Mr. Fox, jun., who conducted the sale, addressed the company at considerable length, enlarging on the great value of the property now offered, and observing that all the buildings were substantial and appropriate for their object and position, and occupied by firms of respectability and good commercial status. He said that in view of the present conversion of Consols no security could surpass, and few could equal, that of a freehold ground-rent. The leases in the several lots were for unexpired terms varying from sixty-nine to seventy-six years. The first lot submitted was a ground-rent of 443*l.* 16s. per annum, secured upon property in Long-lane. It was sold for 12,500*l.* The next lot, being a ground-rent of 229*l.* per annum, on property adjoining, was sold for 5,700*l.* The next two adjoining lots, being ground-rents of 285*l.* and 124*l.* per annum, were bought in at 6,950*l.* and 3,000*l.* respectively. Lot 5, a ground-rent of 135*l.*, was sold for 3,500*l.*; and the next lot, a ground-rent of 369*l.* per annum, was also sold for 8,400*l.* Lot 7, a ground-rent of 361*l.*, was bought in at 8,200*l.*, and the next lot, a ground-rent of 161*l.*, was sold for 2,800*l.* Three other lots, consisting of ground-rents of 35*l.*, 145*l.*, and 224*l.* per annum respectively, were sold for 820*l.*, 3,500*l.*, and 5,650*l.* The total amount realised by the several lots sold amounted to 39,370*l.*, the unsold lots being bid up to 37,600*l.*, or within about five per cent. of the reserve.

**Building at Berlin.**—The Municipality of Berlin is incurring this year a large expenditure in building operations. For the erection of elementary schools, no less than 2,597,000 marks (129,850*l.*) has been voted; for the erection of high-class schools, 148,000 marks (7,400*l.*). Over five million marks (250,000*l.*) will be spent in the continuation of the following works in progress:—(1) Hospital and convalescent home in the Prenzlauer Allee; (2) police station at the Alexanderplatz: (3) lunatic asylum at Lichtenberg; (4) asylum for the epileptic at Biesdorf; (5) hospital at the Urban. Nearly 750,000 marks (37,500*l.*) will be expended on the following bridges: — Moltkebrücke, Kaiser Wilhelmsbrücke, Albrechtshofer Brücke, Buckower Brücke, the Albrechtsstrassebrücke (for foot passengers only), and a ferry over the canal at the Alexandrinenstrasse. The total expenditure on the above public works will amount to 424,750*l.* The activity in paving streets will equal that of 1887, contracts for 13,300 square mètres of pavements in new streets having been let besides, whilst 140,000 square mètres are to be renewed. Half of the pavement will be granite, half "silent" pavement. It is probable that only asphalte will be used, as the experience with wood pavement has been unfavourable.

**Exhibition of Works in Wood, at Carpenters' Hall.**—The Exhibition of Works in Wood, under the auspices of the Worshipful Companies of Carpenters and Joiners, is to be opened by the Lord Mayor this day, Saturday, May 12, at two p.m.

**Civil and Mechanical Engineers' Society.**—This Society will pay a visit this Saturday, May 12, to the Wolverton and Stony Stratford Steam Tramway. The members will leave Euston by the 10·10 a.m. train for Wolverton.

**The London Geological Field Class,** under the direction of Prof. H. G. Seeley, commences the summer excursions on Whit-Monday, May 21st, and will continue them on Saturday afternoons thereafter up to the 14th of July. The following are among some of the places which will be visited:—Leatherhead and Boxhill, to examine the gorge of the Mole in chalk; Maidstone and the vicinity, for gravels, Woolwich and Reading beds, chalk, gault, and lower greensand; Erith and Crayford, for river gravels; Grays, in Essex, Northfleet, and Oxsted, for studies in chalk, and other places besides. Intending students should apply for tickets at once, as only a limited number are issued. Application forms may be had from Messrs. G. Philip & Sons, 32, Fleet-street.

**The Wood Pulp and Wood Exports of Sweden.**—The export of wood pulp from Sweden last year amounted to 28,508 tons, against 25,630 tons in 1886, half of which went to this country. The timber export was, in cubic mètres:—Deals, battens, and boards, 3,280,000 (3,080,000 in 1886); planed boards, 170,000 (149,000 in 1886); and balks, spars, &c., 260,000 (130,000 in 1886).

**Simson & Mason (Limited).** — This Company has just declared an interim dividend for the six months ending April 30th at the rate of 8 per cent. per annum.

## PRICES CURRENT OF MATERIALS.

| TIMBER. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|
| Greenheart, B.G. ....ton | 6 | 10 | 0 | 7 | 10 | 0 |
| Teak, E.I. ....load | 8 | 0 | 0 | 12 | 10 | 0 |
| Sequoia, U.S. ....foot cube | 0 | 2 | 3 | 0 | 3 | 0 |
| Birch, Canada....load | 2 | 15 | 0 | 4 | 15 | 0 |
| Fir, Dantsic, &c. .... | 2 | 0 | 0 | 4 | 0 | 0 |
| Oak ,, .... | 2 | 0 | 0 | 4 | 10 | 0 |
| Canada .... | 4 | 0 | 0 | 6 | 10 | 0 |
| Pine, Canada red .... | 2 | 10 | 0 | 3 | 10 | 0 |
| ,, yellow .... | 2 | 10 | 0 | 4 | 0 | 0 |
| Lath, Dantsic ....fathom | 3 | 10 | 0 | 5 | 0 | 0 |
| St. Petersburg .... | 5 | 0 | 0 | 6 | 0 | 0 |
| Wainscot, Odessa, crown.... | 2 | 10 | 0 | 3 | 0 | 0 |
| Deals, Finland, 2nd and 1st...std.100 | 8 | 0 | 0 | 9 | 10 | 0 |
| ,, 4th and 3rd .... | 6 | 10 | 0 | 7 | 10 | 0 |
| Riga .... | 6 | 0 | 0 | 7 | 10 | 0 |
| St. Petersburg, 1st yellow .... | 9 | 10 | 0 | 14 | 10 | 0 |
| ,, 2nd ,, .... | 8 | 0 | 0 | 9 | 0 | 0 |
| ,, white .... | 7 | 0 | 0 | 10 | 0 | 0 |
| Swedish .... | 7 | 0 | 0 | 15 | 10 | 0 |
| White Sea .... | 8 | 0 | 0 | 17 | 0 | 0 |
| Canada, Pine, 1st .... | 14 | 0 | 0 | 23 | 0 | 0 |
| ,, ,, 2nd.... | 9 | 0 | 0 | 15 | 0 | 0 |
| ,, ,, 3rd, &c.... | 7 | 5 | 0 | 9 | 10 | 0 |
| ,, Spruce, 1st .... | 8 | 0 | 0 | 9 | 10 | 0 |
| ,, ,, 3rd and 2nd .... | 6 | 0 | 0 | 7 | 10 | 0 |
| New Brunswick, &c.... | 6 | 5 | 0 | 7 | 5 | 0 |
| Battens, all kinds .... | 8 | 10 | 0 | 11 | 0 | 0 |
| Flooring Boards, sq., 1 in., prepared, First .... | 0 | 10 | 0 | 0 | 12 | 0 |
| Second .... | 0 | 7 | 0 | 0 | 9 | 0 |
| Other qualities .... | 0 | 4 | 6 | 0 | 6 | 6 |
| Cedar, Cuba ....foot | 0 | 0 | 3½ | 0 | 0 | 4 |
| Honduras, &c. .... | 0 | 0 | 3½ | 0 | 0 | 3½ |
| Australian .... | 0 | 0 | 2½ | 0 | 0 | 3½ |
| Mahogany, Cuba .... | 0 | 0 | 4½ | 0 | 0 | 6 |
| St. Domingo, cargo average .... | 0 | 0 | 4½ | 0 | 0 | 6 |
| Mexican ,, .... | 0 | 0 | 4 | 0 | 0 | 4½ |
| Tobasco ,, .... | 0 | 0 | 4½ | 0 | 0 | 5½ |
| Honduras ,, .... | 0 | 0 | 4½ | 0 | 0 | 5½ |
| Rose, Rio ....ton | 8 | 0 | 0 | 11 | 0 | 0 |
| Box, Turkey .... | 5 | 0 | 0 | 12 | 0 | 0 |
| Walnut, Italian ....foot | 0 | 0 | 4 | 0 | 0 | 5½ |
| **METALS.** | | | | | | |
| IRON—Bar, Welsh, in London...ton | 4 | 17 | 6 | 5 | 0 | 0 |
| ,, ,, at works in Wales ... | 4 | 7 | 6 | 4 | 10 | 0 |
| ,, Staffordshire, London .... | 5 | 5 | 0 | 7 | 0 | 0 |
| COPPER— | | | | | | |
| British, cake and ingot ....ton | 81 | 0 | 0 | 0 | 0 | 0 |
| Best selected .... | 82 | 0 | 0 | 0 | 0 | 0 |
| Sheets, strong.... | 88 | 0 | 0 | 0 | 0 | 0 |
| Chili, bars .... | 80 | 0 | 0 | 80 | 10 | 0 |
| YELLOW METAL....lb. | 0 | 0 | 7½ | 0 | 0 | 7½ |
| LEAD— | | | | | | |
| Pig, Spanish ....ton | 13 | 5 | 0 | 0 | 0 | 0 |
| English, common brands.... | 13 | 7 | 6 | 0 | 0 | 0 |
| Sheet, English .... | 14 | 10 | 0 | 14 | 15 | 0 |
| SPELTER— | | | | | | |
| Silesian, special ....ton | 17 | 15 | 0 | 18 | 0 | 0 |
| Ordinary brands.... | 17 | 0 | 0 | 17 | 10 | 0 |
| TIN— | | | | | | |
| Straits ....ton | 80 | 0 | 0 | 0 | 0 | 0 |
| Australian .... | 80 | 0 | 0 | 0 | 0 | 0 |
| ZINC— | | | | | | |
| English sheet ....ton | 22 | 0 | 0 | 22 | 10 | 0 |
| **OILS.** | | | | | | |
| Linseed ....ton | 18 | 7 | 6 | 18 | 10 | 0 |
| Cocoanut, Cochin .... | 27 | 0 | 0 | 28 | 0 | 0 |
| Ceylon .... | 24 | 0 | 0 | 0 | 0 | 0 |
| Palm, Lagos .... | 21 | 0 | 0 | 21 | 10 | 0 |
| Rapeseed, English pale .... | 24 | 0 | 0 | 24 | 5 | 0 |
| ,, brown .... | 22 | 12 | 6 | 22 | 15 | 0 |
| Cottonseed, refined .... | 21 | 0 | 0 | 21 | 10 | 0 |
| Tallow and Oleine.... | 25 | 0 | 0 | 45 | 0 | 0 |
| Lubricating, U.S.... | 5 | 0 | 0 | 6 | 0 | 0 |
| ,, refined.... | 5 | 0 | 0 | 12 | 0 | 0 |
| TURPENTINE— | | | | | | |
| American, in casks ....cwt. | 1 | 8 | 6 | 0 | 0 | 0 |
| TAR— | | | | | | |
| Stockholm ....barrel | 0 | 15 | 0 | 0 | 0 | 0 |
| Archangel .... | 0 | 9 | 6 | 0 | 0 | 0 |

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitoms of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Plans for Club, Hall, and Offices, Yeovil | Constitutional Club Co. | Not stated | May 24th | ii. |
| Laying-out Estate, &c., near Liverpool | W. P. Hartley | 50 gs., 30 gs., & 20 gs. | June 5th | ii. |
| Restoration of St. Lawrence Church, Jersey | The Committee | 30*l.* | June 30th | ii. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Oak Park Fencing and Gates | Met. Board of Works | *Official* | May 15th | ii. |
| Rebuilding Union House | Chelmsford Union | F. Chancellor | do. | ii. |
| 8-ton Self-registering Weigh-bridge | Richmond Union | *Official* | May 16th | ii. |
| Asphalte Paving | St. Margaret & St. John (Westminster) Ves. | G. R. W. Wheeler | do. | x. |
| Boat-house, &c., St. Leonard's | Admiralty | *Official* | May 18th | ii. |
| Mess Rooms and Cottages | Fareham County Asylum | J. Robinson | May 21st | ii. |
| Roads and Sewers | Streatham and General Estates Co., Lim. | Street & Scholefield | do. | ii. |
| Granite | St. George's-in-the-East Vestry | *Official* | May 23rd | xii. |
| Footway Paving, Pipe-Sewers, &c. | St. Luke's Vestry | do. | do. | x. |
| Pipe-Sewers, Road-Making Works, &c. | Cleethorpes Local Brd. | W. H. Radford | do. | ii. |
| Road-Making and Paving Works | Fulham Vestry | J. P. Norrington | do. | x. |
| Broken Granite, &c. | Hackney Board of Wks | J. Lovegrove | do. | xi. |
| Painting Exterior Ironwork | Met. Asylums Board | *Official* | May 24th | x. |
| Laying of Rising Mains | Leicester Corporation | J. Gordon | do. | x. |
| Public Baths | Gloucester Cor. | J. Fletcher Trew | do. | x. |
| Erection of Hospital | Met. Asylums Board | A. & C. Harston | May 26th | x. |
| Repairing Roads near Battersea Park | Com. of H.M. Works | *Official* | May 27th | x. |
| Sundry Repairs, Painting, &c. | Central London Sick Asylums District | do. | May 28th | ii. |
| Timber | Eton Union | | May 29th | xi. |
| Engineering Works to Laundry, &c. | Gateshead Union | Morton, Newcombe, & Co | do. | xi. |
| Macadam, Granite Chippings, &c. | Toxteth Park Local Bd. | J. Price | May 30th | x. |
| Sewage Tanks, Carriers, &c. | Leicester Corporation | J. Gordon | May 31st | x. |
| Granite Setts | Hull Corporation | A. E. White | do. | x. |
| School Buildings | Leyton School Board | B. Newman | June 4th | xii. |
| Alterations, &c., to Old National School | New Alresford Sch. Bd. | W. H. Hunt | June 6th | x. |
| Dredging | Southampton Harbour B | *Official* | June 11th | xii. |
| First Portion, Imperial Institute | Organising Committee | T. E. Colcutt | Not stated | ii. |
| Two Schools | Tottenham School Brd. | C. Bell | do. | ii. |
| Limewhiting, Painting, &c., Portsmouth | War Department | *Official* | do. | ii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page |
|---|---|---|---|---|
| Clerk of Works | Hammersmith Vestry | 2*l.* 2s. weekly | May 12th | xvii. |
| Clerk of Works | Fulham Vestry | 2*l.* 12s. 6d. ,, | May 15th | xvi. |
| Outdoor Assistant | Vestry of St. Mary Abbotts, Kensington | 150*l.* | May 22nd | xvii. |

## TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

BATTERSEA.—For the construction of a brick culvert from the river Thames to the lake in Battersea Park, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer :—

J. Mowlem & Co. (accepted) ..... £1,200 0 0

BECKENHAM.—For completing house, Beckenham-grove, Kent :—

| | |
|---|---|
| Cox | £700 0 0 |
| Hoban | 685 0 0 |
| Illingworth | 426 10 0 |
| Taylor | 420 0 0 |
| Jones | 400 0 0 |

CROSSNESS.—For outfall sewage works at Crossness, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer :—

William Webster (accepted) ..... £259,816 0 0

[Full list is given on p. 342 of this week's *Builder*.]

CLAPHAM JUNCTION.—For pulling down old premises and building new stores, &c., for Messrs. Francis & Son. Mr. R. W. Cruwys, architect :—

Kynock (accepted) ..... £6,670 0 0

DUNMOW (Essex).—For erecting six cottages, for Mr. O. G. Clarke. Mr. James F. Wesley, architect, Forest-gate :—

| | Each Cottage. |
|---|---|
| G. E. Baney, Forest-gate (accepted) | £197 10 0 |

EALING.—For the erection of residence at Castle Bar, Ealing, for Mr. R. J. G. Read. Mr. E. J. May, architect, 21, Hart-street, Bloomsbury-square :—

| | |
|---|---|
| Chapman | £1,370 0 0 |
| Nye | 1,190 0 0 |
| J. J. Bryant (accepted) | 1,146 0 0 |

ELSTREE (Herts.).—For the erection of an unrobing room to the Elstree School, Herts., for the Rev. L. Sanderson. Mr. E. P. Loftus Brock, F.S.A., architect :—

| | |
|---|---|
| Hicks, Elstree | £494 0 0 |
| Staples, Elstree | 485 18 0 |
| Batchelor, Harrow | 448 0 0 |

FOREST HILL.—For erecting and completing the Façade (shops) at Forest Hill, S.E. Mr. F. J. Chambers, architect :—

J. O. Richardson, Albert Works, Peckham (accepted) ..... £111 0 0

HARROW.—For the completion of two houses at Hinde's-road, Harrow. No quantities. Mr. Christopher M. Shiner, architect :—

J. O. Richardson, Albert Works, Peckham ..... £562 0 0

HEDNESFORD. — For erecting an infants' school for the accommodation of 300 children, at West Hill, Hednesford, for the Cannock School Board (Staff.). Mr. Fred. W. Evans, architect, 83, High-street, Birmingham. Quantites supplied by the architect :—

| | |
|---|---|
| J. Wootton, Bloxwich, Staff. | £1,607 0 0 |
| A. J. D. Whittome, Gaol-square, Stafford | 1,557 0 0 |
| Thos. Mason, Hednesford | 1,545 0 0 |
| Bradney & Co., Wolverhampton | 1,497 0 0 |
| Robt. Barton,* Hednesford | 1,400 0 0 |
| Wm. Ingram, Cannock | 1,384 0 0 |
| H. Dorse & Son, Cradley Heath | 1,340 6 0 |
| Gowing & Ingram, Birmingham | 1,285 0 0 |

* Accepted.

KINGSTON-ON-THAMES.—For the erection of New Inn, Spring-grove, Kingston-on-Thames, for Hodgson's Kingston Brewery Company, Limited :—

| | |
|---|---|
| Macrostir | £2,933 0 0 |
| Downes | 2,718 0 0 |
| Oldridge & Sons | 2,698 0 0 |
| J. Wheatley & Sons | 2,678 0 0 |
| J. W. Falkner | 2,655 0 0 |
| W. Callingham | 2,649 0 0 |
| W. Lane | 2,595 0 0 |
| C. & T. Atkins | 2,560 0 0 |
| Edwin Wells | 2,478 12 1 |
| Jarvis | 2,378 0 0 |
| Alf. Merryweather | 2,190 0 0 |

LEYTONSTONE.—For rebuilding the Crown public-house and three shops, at Leytonstone, for Mr. Rawe. Mr. E. C. Beaumont, architect, Ludgate-circus :—

| | |
|---|---|
| Holland | £7,160 0 0 |
| Walker | 7,062 0 0 |
| Lascelles | 7,040 0 0 |
| Cocks | 6,810 0 0 |
| Nichols | 6,541 0 0 |
| Read | 6,285 0 0 |
| Jackson & Todd | 6,238 0 0 |
| Green & Lee | 6,168 0 0 |
| Lumm | 5,685 0 0 |
| Wyles | 5,462 0 0 |
| Hood | 5,435 0 0 |

LONDON.—For the drainage and sanitary works at Portland-place, for Lady Tenterden and the Hon. and Rev. W. Byron. Mr. Edward Tidman, C.E., surveyor, Connaught-mansions, Victoria-street, Wesiminster, S.W. :—

| | |
|---|---|
| W. J. Burningham | £166 0 0 |
| W. H. T. Kelland (accepted) | 124 17 6 |

LONDON.—For new drainage and sanitary works at Hamilton House, Arlington-street, for the Right Hon. Lord Wimborne. Mr. Edward Tidman, C.E., surveyor, Connaught-mansions, Victoria-street, Westminster, S.W. :—

| | Drains. | Plumber's Work. |
|---|---|---|
| G. Trollope & Sons* | £366 0 0 | £110 0 0 |

* Accepted.

LONDON.—For alterations and repairs at the Gate-house public-house, Hampstead-road, N.W., for Mr. Sidney Price Smith. Mr. Arthur W. Saville, architect, 99, Strand, W.C. Quantities supplied :—

*General Works.*

| | |
|---|---|
| W. Oldrey & Co. | £1,449 0 0 |
| R. S. Parker | 1,177 0 0 |
| Ward & Lamble | 1,130 0 0 |
| J. T. Chappell | 1,120 0 0 |
| R. Perkins | 1,090 0 0 |
| Gould & Brand | 1,087 0 0 |
| T. Walker | 1,081 0 0 |
| S. Yardley & Sons | 1,055 0 0 |
| Spencer & Co. (accepted) | 1,040 0 0 |

*Pewterer's Work.*

| | |
|---|---|
| Watts & Co. (accepted) | £88 17 0 |

*Gasfittings.*

| | |
|---|---|
| E. Pragnell (accepted) | £35 10 0 |

LONDON.—For the erection of new offices, for the International News Company, at Breams-buildings, E.C. Mr. Christopher M. Shiner, architect, 15, New Broad-street, E.C. :—

| | |
|---|---|
| Ansell | £2,021 0 0 |
| Staines & Son | 1,972 0 0 |
| Marsland | 1,955 5 0 |
| Rhodes | 1,935 0 0 |
| Jerrard | 1,793 0 0 |
| Mills | 1,750 0 0 |
| Richardson | 1,742 0 0 |

LONDON.—For erecting warehouse, Great Saffron-hill, E.C., for Messrs. Longmans, Green, & Co., of Pater-noster-row. Mr. Geo. Hubbard, architect :—

F. Curtis & Co.* ..... £9,200 0 0

* Accepted without competition.

LONDON.—For new shop front, and other alterations and additions to 43, Upper-street, Islington, for Mr. Wm. Huntsman. Mr. Edmund J. Harrison, architect, 72, Chancery-lane, W.C. :—

Drew & Cadman,* High Holborn ..... £528 0 0

* Accepted with modifications and additions.

LONDON. — For the erection of new refreshment rooms at General Post Office (East), London, E.C., for Her Majesty's Office of Works. Mr. Henry Tanner, architect, and quantities by Mr. John Nicholls :—

J. O. Richardson, Albert Works, Peckham (accepted) ..... £2,058 0 0

LONDON.—For erection and completion of a new sorting office at Herne Hill, for Her Majesty's Office of Works. Mr. R. H. Boyce, architect ; quantities by Mr. C. W. Stephenson :—

J. O. Richardson, Albert Works, Peckham (accepted) ..... £879 0 0

NEW BARNET. — For the erection of four semi-detached houses at New Barnet, for Messrs. Blake & Farrar :—

| | |
|---|---|
| Beaves Bros., Kentish-town | £2,150 0 0 |
| Stroll & Co., Blackfriars-road | 1,950 0 0 |
| Henley & Co., Upper Norwood | 1,870 0 0 |
| J. Curnow, High Barnet | 1,718 0 0 |
| Dover, Wood, & Co., Goswell-road | 1,711 17 0 |
| Bishop Bros. & Marston, Islington | 1,540 0 0 |
| W. Pavey, Winchmore-hill | 1,464 0 0 |
| Harrison & Crabb, Enfield | 1,440 0 0 |
| J. P. Groome,* Islington | 1,250 0 0 |

* Since withdrawn, and revised tender sent in for 1,560*l.*

NEW SOUTHGATE.—For new saloon bar at the Northern Star, for Mr. S. W. Acomb. Mr. Girling Bray, architect, New Southgate :—

| | |
|---|---|
| F. Voller | £219 0 0 |
| G. Life | 207 0 0 |
| Mears | 196 0 0 |
| R. Selwood | 195 7 0 |
| Pitman | 194 0 0 |
| J. C. Emery (accepted) | 185 10 0 |

NEWPORT (Mon.).—For new schools at Tydu, accommodating 300 children, for the Rogerstone and Henllys School Board. Mr. E. A. Lansdowne, architect. Quantities by the architect. :—

| | |
|---|---|
| Jones & Co., Gloucester | £3,449 0 0 |
| H. Parfitt, Newport | 2,730 0 0 |
| Executors of Gadwell, Barrow | 2,727 0 0 |
| Wm. Jones & Son, Newport | 2,675 0 0 |
| John Linton, Newport | 2,590 0 0 |
| Edwin Richards | 2,550 0 0 |
| Charles Miles | 2,494 0 0 |
| C. Edwards, Leominster | 2,327 0 0 |
| Wm. Price, Newport | 2,317 0 0 |
| W. A. Linton, Newport | 2,250 0 0 |
| G. H. Bailey,* Pontypool | 2,110 0 0 |

* Accepted.

NORTHAMPTONSHIRE.—For alterations and additions to Overthorpe Lodge, Northants., for Mr. J. H. Blacklock. Mr. W. E. Mills, architect, Banbury :—

| | |
|---|---|
| Orchard & Sons | £4,797 0 0 |
| C. Claridge | 4,735 0 0 |
| Thos. Page | 4,400 0 0 |
| R. Jarvis | 4,191 13 4 |
| J. S. Kimberley (accepted) | 4,143 0 0 |

PECKHAM.—For the enlargement of the Woods-road School, Peckham, for the London School Board. Quantities by Messrs. T. Thornton Green & Pietersen. Mr. Thos. J. Bailey, architect :—

| | |
|---|---|
| L. Bottoms | £3,058 0 0 |
| Scharien & Co. | 2,851 0 0 |
| J. W. Bunning & Son | 2,848 0 0 |
| T. Bendon | 2,692 0 0 |
| J. Ford & Son | 2,677 0 0 |
| W. H. Lorden & Son | 2,649 0 0 |
| J. Marsland | 2,625 0 0 |
| J. & C. Bowyer | 2,538 0 0 |
| H. Hart | 2,484 0 0 |
| Kirk & Randall | 2,483 0 0 |
| W. Johnson | 2,398 0 0 |
| C. Wall | 2,388 0 0 |
| H. L. Holloway | 2,383 0 0 |
| Stimpson & Co. | 2,380 0 0 |
| W. Downs | 2,356 0 0 |
| Norris & Luke | 2,226 0 0 |
| J. O. Richardson (accepted) | 2,161 0 0 |

RATCLIFF.—For partly pulling down and rebuilding Warehouses C and E, at Free Trade Wharf, situate in Broad-street, Ratcliff, for the Free Trade Wharf Company. Mr. Charles Dunch, architect, St. Clement's House, Clement's-lane, City, E.C. Quantities by Mr. James F. Wesley, Romford-road, Forest-gate :—

| | | | |
|---|---|---|---|
| J. Grover & Son | £1,400 | 0 | 0 |
| Atherton & Latta | 1,250 | 0 | 0 |
| B. E. Nightingale | 1,126 | 0 | 0 |
| Ashby & Horner | 1,096 | 0 | 0 |
| Colls & Son | 1,076 | 0 | 0 |
| Harris & Wardrop | 1,075 | 0 | 0 |
| Jas. Morter | 1,050 | 0 | 0 |
| J. & J. Greenwood | 999 | 0 | 0 |

ST. GEORGE'S-IN-THE-EAST.—For erecting cottages situate in Worcester-street, for Mr. J. M. Winn. Mr James F. Wesley, architect, Forest-gate :—

| | | | |
|---|---|---|---|
| E. Palmer (accepted) | £520 | 0 | 0 |

SEVENOAKS.—For additions to workhouse infirmary buildings, for the Guardians of the Sevenoaks Union. Mr. Thos. Potter, architect. Quantities by the architect :—

| | | | |
|---|---|---|---|
| R. Durtnell, Brasted (accepted) | £1,373 | 0 | 0 |

SEVENOAKS.—For new stabling, &c., at Oakhill, Sevenoaks, for Mr. A. Wilson. Mr. Thos. Potter, architect. Quantities by architect :—

| | | | |
|---|---|---|---|
| R. Durtnell, Brasted | £397 | 0 | 0 |
| W. Wiltshire, Sevenoaks | 394 | 0 | 0 |
| E. Bevan, Sevenoaks (accepted) | 375 | 0 | 0 |

SHADWELL.—For partly pulling down, rebuilding, repairing, and painting the Britannia beer-house, situate in High-street, for Mr. William Smellie. Mr. James F. Wesley, architect, Forest-gate :—

| | | | |
|---|---|---|---|
| E. Palmer (accepted) | £152 | 10 | 0 |

SOUTH KENSINGTON. — For the completion of No. 44, Harrington-road, South Kensington. Messrs. Lewin, Sharp & Arpin, architects :—

| | | | |
|---|---|---|---|
| J. O. Richardson, Albert Works, Peckham* | £1,080 | 0 | 0 |

* Amended estimate accepted.

SOUTH KENSINGTON.—For additions to South Kensington sub-district Post-Office. Mr. R. H. Boyce, architect. Quantities by Mr. F. A. H. Hardcastle :—

| | | | |
|---|---|---|---|
| J. O. Richardson, Albert Works, Peckham (accepted) | £858 | 0 | 0 |

SOUTH PETHERWYN (Cornwall).—For the entire restoration of church (allowing for old materials). Mr. Geo. H. Fellowes Prynne, architect, 10, Torrington-square, London. Quantities supplied by Mr. R. Henry Hale, surveyor :—

| | | | |
|---|---|---|---|
| Lapthorne & Goad | £3,400 | 0 | 0 |
| W. Wiffen | 3,230 | 0 | 0 |
| W. Burt | 2,800 | 0 | 0 |
| Doidge & Son | 2,784 | 0 | 0 |
| E. Rendell | 2,737 | 0 | 0 |
| Knight & Son | 2,714 | 0 | 0 |
| P. Blowey | 2,610 | 0 | 0 |
| R. M. Rowse | 2,550 | 0 | 0 |
| Strike & Dingle | 2,419 | 0 | 0 |
| Isaac Rosekilly (accepted) | 2,399 | 0 | 0 |

STOCKWELL.—For rebuilding the Brewery Tap, the Brewer's Delight, Lingham-street, Stockwell, for Mr. C. Hammerton. Mr. Stanley Parker, architect :—

| | | | |
|---|---|---|---|
| Mallett | £1,350 | 0 | 0 |
| Maxwell Bros. | 1,298 | 0 | 0 |
| Bishop | 1,224 | 0 | 0 |
| Prestige & Co. (accepted) | 1,168 | 0 | 0 |

WEST LEXHAM (Norfolk).—For sundry alterations to the rectory. Mr. C. S. Beck, architect, 9, Grove-street, West Norwich :—

| | | | |
|---|---|---|---|
| Geo. Tye (accepted) | £303 | 0 | 0 |

WIMBLEDON. — For alterations and additions to Emmanuel Church. Mr. C. L. Luck, architect, 12, Regent-street, S.W. :—

| | | | |
|---|---|---|---|
| Higgs & Hill | £3,400 | 0 | 0 |
| Vare | 3,322 | 0 | 0 |
| Kirk Bros. | 3,290 | 0 | 0 |
| Messum | 3,195 | 0 | 0 |
| Nightingale | 3,187 | 0 | 0 |
| Adkins Bros. | 3,074 | 0 | 0 |
| Oldridge & Sons | 2,984 | 0 | 0 |

WOODFORD (Essex).—For the erection of a home for girls, at Woodford Wells, for the Society for the Rescue of Young Women and Children. Mr. Edward Tidman, C.E., architect, Connaught-mansions, Victoria-street, Westminster. Quantities supplied :—

| | | | |
|---|---|---|---|
| Hendley & Co. | £2,803 | 0 | 0 |
| J. W. Bunning & Son | 2,090 | 0 | 0 |
| W. J. Botterill | 2,077 | 0 | 0 |
| D. Elwood & Son | 1,977 | 0 | 0 |
| W. Johnson | 1,950 | 0 | 0 |
| Kirk & Randall | 1,925 | 0 | 0 |
| Dover, Wood, & Co. | 1,911 | 0 | 0 |
| Staines & Son | 1,834 | 0 | 0 |
| Shillitoe & Son | 1,759 | 0 | 0 |
| W. H. T. Kelland | 1,738 | 0 | 0 |
| Chas. Reed | 1,736 | 0 | 0 |
| Paine Bros. | 1,730 | 0 | 0 |
| S. Sabey & Son | 1,699 | 0 | 0 |
| Francis Ranger | 1,694 | 0 | 0 |
| Joseph Holland | 1,687 | 0 | 0 |
| Barrett & Power | 1,686 | 0 | 0 |
| Caulsell Bros. | 1,680 | 0 | 0 |
| W. M. Dabbs | 1,669 | 0 | 0 |
| Henry Wells | 1,655 | 0 | 0 |
| John J. Robson | 1,648 | 0 | 0 |
| Solden Hepwell | 1,606 | 10 | 0 |
| Woodhouse | 1,583 | 0 | 0 |
| North Bros. | 1,550 | 0 | 0 |
| F. J. Coxhead | 1,520 | 0 | 0 |
| Brooks & Meader, Enfield | 1,227 | 0 | 0 |

*Additions, Kensington Workhouse.*—In our issue of last week, p. 329, in the list of Tenders for Kensington Workhouse, for Ashford & Co. read *Ashfold & Co.*

## TO CORRESPONDENTS.

*Registered Telegraphic Address,* "THE BUILDER, LONDON."

T. D. (below our mark).—Lady F. C. (we have every sympathy with the endeavour on general philanthropic grounds, but the further discussion of it is hardly within our province).—W. C. M.—H. & J.—J. B. (your statement is no contradiction of the statement as we gave it).—E. W. W. (too late for this week).—C. F. K. (should send amounts).—F. D. (ditto).—H. E. R. (ditto).—G. S. (ditto).—E. T. (should have sent amounts in *all* cases).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication

We are compelled to decline pointing out books and giving addresses.

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